REVIEW AND APPROVALS

RUBY LAKE NATIONAL WILDLIFE REFUGE

Ruby Valley, Nevada

ANNUAL NARRATIVE REPORT

Calendar Year 1995

Refuge Manager _____ Date

Refuge Supervisor _____ Date

Approval _____ Date

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U. S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

INTRODUCTION

Ruby Lake National Wildlife Refuge (refuge) is located at the south end of Ruby Valley in northeastern Nevada. The refuge is 65 miles southeast of the town of Elko and lies along the eastern flank of the rugged and scenic Ruby Mountains at an elevation of 6000 feet above mean sea level. In 1938 Ruby Lake NWR was established by Executive Order number 7923 under the Migratory Bird Conservation Act (45 Stat. 1222) as "a refuge and breeding ground for migratory birds and other wildlife...". Lands incorporated into the refuge were withdrawn federal lands and purchased private lands.

The 37,632 acre refuge is contained within a closed hydrologic basin and consists of a marsh bordered by meadows, grasslands, and brush-covered uplands. The shallow, pristine marsh is a mosaic of open water, bulrush stands, and grass/brush-covered islands. During the Pleistocene Epoch, the refuge was part of a much larger body of water presently known as Lake Franklin. This ancient lake covered over 300,000 acres and was more than 200 feet deep. As climatic conditions changed the lake level declined. Today, only 27,000 acres of wetlands remain in Ruby Valley and consist of Ruby Lake and Franklin Lake marshes.

Ruby Lake NWR is one of the most important waterfowl nesting areas in the Great Basin and the Intermountain West. The refuge consistently provides high quality upland and wetland habitats and is strategically located along migration corridors serving both the Pacific and Central flyways. During spring migration, birds converge on the refuge from the Humboldt River drainage to the west, Owens Valley to the southwest, the Great Salt Lake to the east, the Klamath Basin to the northeast and the Colorado River and Imperial Valleys to the south. Because of the biological diversity and pristine condition of the habitat the South Marsh was declared a National Natural Landmark in 1972 by the National Park Service.

The marsh is supplied with water from over 150 springs emanating from the basin floor and from springs located along the base of the southern half of the Ruby Mountains. The volume and water content of the snowpack on the mountains directly influences the amount of water provided by the springs. Radio isotope research showed that water from the snowpack takes 1 to 1.5 years to percolate through the mountains and reach the marsh although the pressure created from melting snow influences the volume of water which annually flows from the springs.

Water from some of these springs is collected in a ditch where it can be diverted to five small marsh units and three larger wetland areas. Water reaching the end of the Collection Ditch flows into the 7,300 acre South Marsh, a natural depression at the south end of the refuge. Water can also be diverted through the small west marsh units to the North and East marsh units to maintain shallow wetlands that are especially attractive to waterfowl and shorebirds. Water is managed to provide optimum nesting and feeding habitat for migratory waterfowl and other wetland-dependent bird species. Manipulation of water elevations and flows provides up to 17,000 acres of marsh habitat during consecutive years with average or above average precipitation.

Management of wetland and upland habitats attempts to maintain a high quality ecosystem and a high level of productivity in order to meet the needs of wildlife. Upland areas bordering the marsh are managed for bird species such as upland nesting waterfowl, sandhill cranes, Canada geese, white-faced ibis, and long-billed curlews. Prescribed fire, grazing, haying, and irrigation are used to manipulate vegetation in the meadow and grassland habitats.

The marsh also provides habitat for three fish species and muskrats. The largest mule deer herd in Nevada occurs in the nearby Ruby Mountains and some of these animals forage and fawn on the refuge. The refuge has become increasingly more important to pronghorn antelope which use the grasslands during spring, summer and fall. Grasslands and sagebrush steppe provide habitat for rabbits, rodents, coyotes, and bobcats which are attracted to the refuge because of high prey density. Riparian areas on the refuge are host to porcupines, weasels, and many song bird species. Both sage grouse and badgers are observed in the sagebrush steppe areas of the refuge and marmots live in the rocky slopes of the Ruby Mountains. Many raptor species nest in the area or utilize the refuge during migration and winter.

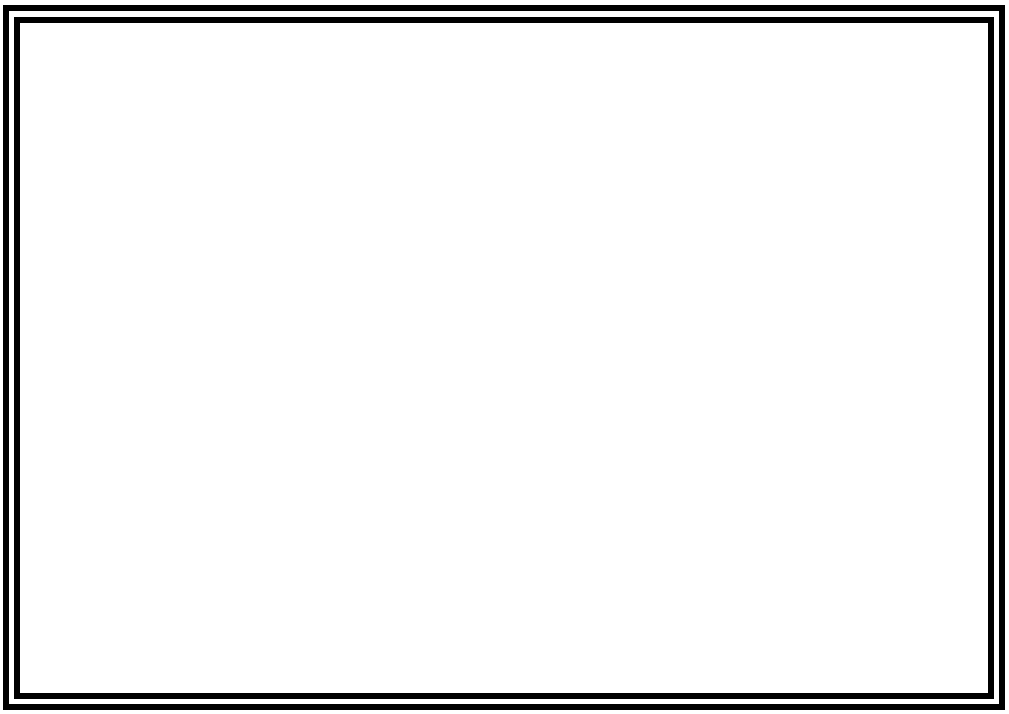

Figure 1. Flynn Spring Creek is nestled on the lower flanks of the scenic Ruby Mountains.
JM ?date

INTRODUCTION

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

K. FEEDBACK

Nothing to Report

L. INFORMATION PACKET

(inside back cover)

A. HIGHLIGHTS

- ☞ Water-year precipitation among highest on record (B)
- ☞ Upland habitat management plan prepared (D2)
- ☞ Sandhill crane colt mortality study initiated (D5)
- ☞ Refuge Manager transfers (E1)
- ☞ Volunteers provide much needed assistance (E4)
- ☞ O and M funding decreases (E5)
- ☞ ARD Doebel and Refuge Supervisor Voros visit the refuge for the first time (E8)
- ☞ Weather interferes with prescribed fire plans (F9)
- ☞ South Marsh water elevation continues to increase (F2)
- ☞ Staff respondes to large wildfire in our initial attack area (F9)
- ☞ Waterfowl use-days and production decreases (G3)
- ☞ Breeding sandhill cranes increases (G4)
- ☞ Public use increases (H1)

B. CLIMATIC CONDITIONS

In typical Great Basin high desert fashion, weather during 1995 was nearly opposite of 1994. In contrast to a hot and dry 1994, 1995 was generally cool and wet. Precipitation and snowpack during the 1994-95 winter was well above average (Figure 2). Water-year precipitation (October 1994 through September 1995) totaled 19.19 inches which was 6.65 inches above the long term water-year mean and 9.56 inches above the 1993-94 water year. Total calendar-year precipitation for 1995 was 6.72 inches above the total for 1994 and 6.07 inches above the long term mean (Table 1). Sixty-five percent of the calendar-year precipitation was received during the first six months of 1995. Mean monthly maximum and minimum temperatures were generally below average during the first seven months and generally above average the last five months. Evaporation during 1995 was 7.6 inches less than 1994 and 3.2 inches below the long term mean.

Table 1. Climatic conditions measured at Ruby Lake NWR during 1995.

Month	Precipitation (inches) 1995	Mean[a]	Evaporation[b] (inches) 1995	Mean	Snow (inches) 1995	Mean[c]	Max. Avg. Temp. (°F) 1995	Mean[d]	Min. Avg. Temp (°F) 1995	Mean[d]
Jan	2.45	1.28			17.3	11.8	36.6	39.1	19.6	13.7
Feb	0.43	1.18			4.5	8.8	52.4	43.1	24.6	17.8
Mar	2.69	1.38			11.0	7.5	47.2	48.4	23.8	24.2
Apr	2.00	1.12	3.4	4.4	10.8	3.6	53.2	57.8	29.3	3.05
May	3.12	1.21	4.4	6.4	1.0	0.8	58.9	66.9	36.6	37.7
Jun	1.48	0.94	6.8	9.0	0.0	0.1	69.4	77.4	42.5	44.8
Jul	0.31	0.51	10.7	10.4	0.0	0.0	84.3	86.9	49.8	51.6
Aug	0.71	0.64	9.8	9.4	0.0	0.0	56.4	85.0	50.0	49.8
Sep	0.80	0.74	6.2	6.1	0.0	0.2	76.5	76.6	41.0	40.6
Oct	0.10	1.01	4.5	3.2	0.0	1.9	65.5	65.0	28.9	30.7
Nov	0.58	1.36			2.7	5.4	57.4	49.6	27.1	22.6
Dec	4.05	1.33			1.2	9.6	42.8	40.6	19.0	15.4
Total	18.72	12.70	45.7	48.9	48.5	49.7				

[a] Mean precipitation, 1940 - 1994
[b] Evaporation not measured November through March
[c] Mean annual snow, 1940 - 1994
[d] Mean monthly temperature, 1940 - 1994

D. PLANNING

2. Management Plan

The refuge Upland Habitat Management Plan (Plan) was first completed in 1980 and a draft revision was prepared in 1992. After receiving valuable comments from reviewers and consideration of the quality of the Plan it decided that the revised draft Plan was not acceptable for refuge habitat management purposes. Wildlife Biologist Mackay spent many months in 1995 preparing a new document which represented a major paradigm shift in habitat management from the 1980 Plan. The draft 1995 Plan was circulated for review at the end of the year.

5. Research and Investigations

Non-game bird surveys of the south Ruby Valley ecosystem. Surveys of habitats on the refuge and on adjacent Forest Service lands were initiated in 1992. The purpose of these surveys is to collect baseline data on non-game bird species occurring in south Ruby Valley during the migration and nesting periods. Transects are surveyed in marsh, meadow, grassland, shrub steppe and pinyon-juniper habitats. The study is funded by the refuge and Wildlife Biologist Mackay is the principle investigator.

A radio telemetry study to determine the causes of juvenile sandhill crane mortality in south Ruby Valley. Research was initiated in 1995 to determine causes of juvenile sandhill crane mortality. In 1995 radio transmitters were attached to two juvenile sandhill cranes. The study was terminated before additional transmitters were attached because of receiver failure and lack of alternate receivers. The two cranes carrying transmitters were monitored visually but disappeared and were presumed dead. The carcasses were not located. The study is funded by the refuge and the Webless Non-game Migratory Bird Research Committee. Wildlife Biologist Mackay is the principle investigator.

Fall and winter locations of Canada geese nesting at Ruby Lake NWR. Research was initiated in 1993 to determine the fall and winter locations of nesting Canada geese. Study objectives include: 1) determine off-refuge locations of Canada geese from August through March, and 2) determine the survival rate both on- and off-refuge. A total of 32 geese were captured and marked with plastic neck collars (black with white codes) and standard aluminum leg bands in 1995. Marked geese have been observed mostly on the Snake River in Idaho. The study is funded by the refuge and Wildlife Biologist Mackay is the principal investigator.

Breeding biology and productivity of largemouth bass at Ruby Lake NWR (14570-03). This is ongoing research conducted by the Nevada Division of Wildlife (NDOW). The purpose of the study is to determine bass nesting and production and angler harvest and influence on the bass population. Creel surveys were not conducted in 1995 due to the lack of anglers. Michael Green, NDOW Fisheries Biologist is the principle investigator.

6. Other

Refuge Manager Pennington assisted in completing the draft Interior Basins Ecoregion Plan. This 120 page document was later shelved during an October Ecoregion meeting. The general consensus of team members was that the plan is useful to the Fish and Wildlife Service for budget formulation and planning, but to take the plan to potential partners without their prior input would be wrong. Instead, the team will involve partners when addressing ecoregion priorities.

E. ADMINISTRATION

1. Personnel

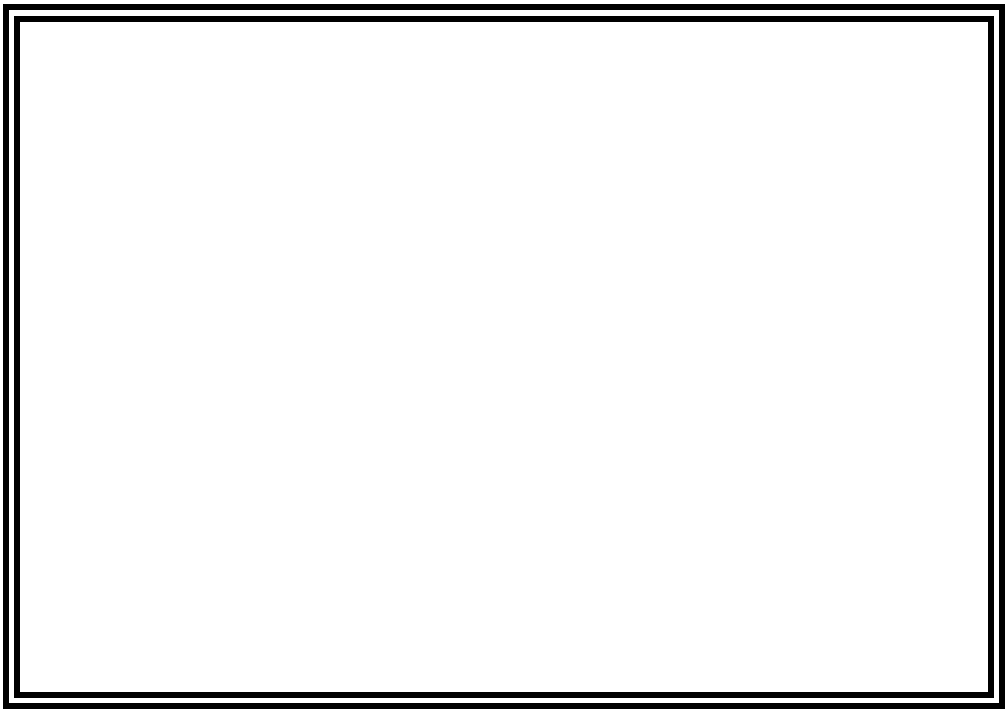

Figure . Staff photo

1. Daniel L. Pennington, Refuge Manager	GS 12/1 EOD 08/30/87 Transferred 08/21/95
2. Jeff Mackay, Wildlife Biologist	GS 09/4 EOD 03/24/91
3. Kevin J. DesRoberts, Operations Specialist	GS 09/2 EOD 06/11/95
4. Monica (Niki) S. McQueary, Administrative Support Assistant	GS 06/6 EOD 04/24/88
5. Daniel K. Johnson, Maintenance Worker	WG 09/5 EOD 07/14/91
6. Jeanne Tinnsman, Volunteer (Biology)	EOD 06/11/95
7. Farrel Reische, Volunteer (Maintenance)	EOD 07/17/95 Terminated 09/29/95
8. Mary Reische, Volunteer (Clerical)	EOD 07/17/95 Terminated 09/29/95

Refuge Manager Pennington and his family departed Ruby Valley in August for Bonners Ferry, Idaho. Pennington was selected as the Refuge Manager at Kootenai NWR, located near the US-Canada border. Pennington spent eight years at Ruby Lake NWR.

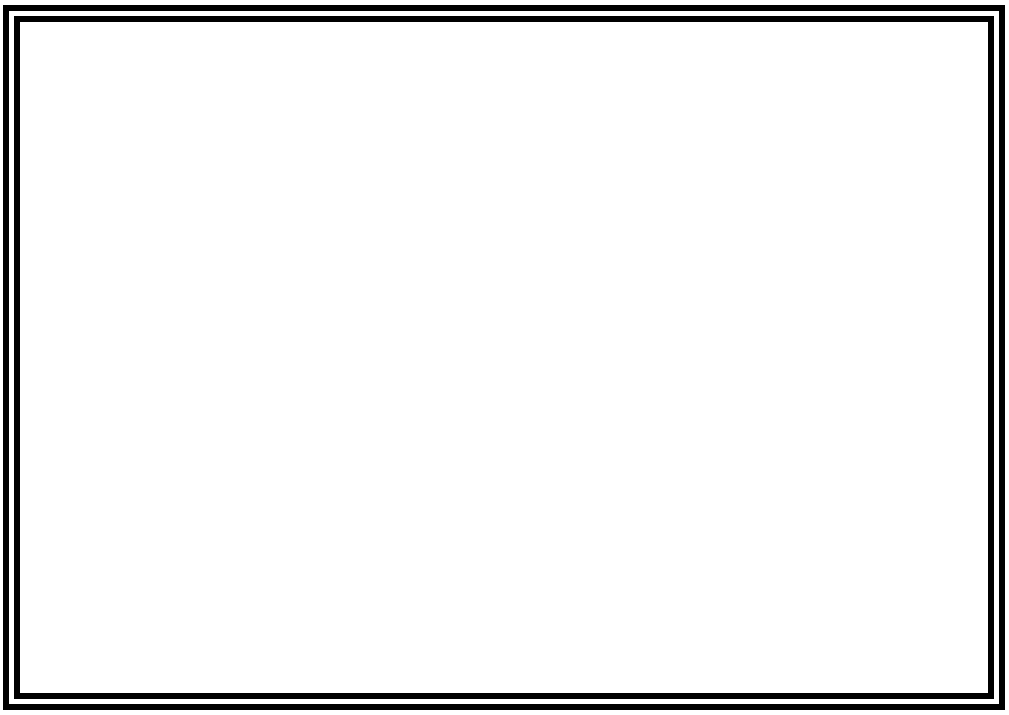

Figure . Refuge staff and local residents gathered to honor Dan Pennington before he and his family moved to Idaho. JM 08/95

The permanent staffing level has remained unchanged during the past five years (Table 2). However, the refuge FTE allocation was reduced from 5.8 to 5.0, which eliminated the hiring

of temporary biological and maintenance staff. The loss of these staff severely impacted refuge operations.

Table . Staffing levels at Ruby Lake NWR.

Fiscal Year	Perm. Full Time	Perm. Part Time	Temporary[a]	Total FTE Used
1995	5	0	1	4.4
1994	5	0	3	5.8
1993	5	0	1	5.2
1992	5	0	2	5.5
1991	5	0	1	5.1

[a] Includes Crew Leader position for YCC.

2. Youth Programs

Ruby Lake NWR hosted a resident Youth Conservation Corps (YCC) program from June 12 to August 4. Two male and three female enrollees were selected. Justin Dean, a college student from Elko, was selected for the YCC Crew Leader position. Justin did an excellent job and was a great role model for the crew. The crew completed several projects and there were no accidents or injuries. Refuge Operations Specialist DesRoberts provided tail gate safety sessions and overall coordination. Wildlife Biologist Mackay conducted environmental education and assisted with coordination of work projects.

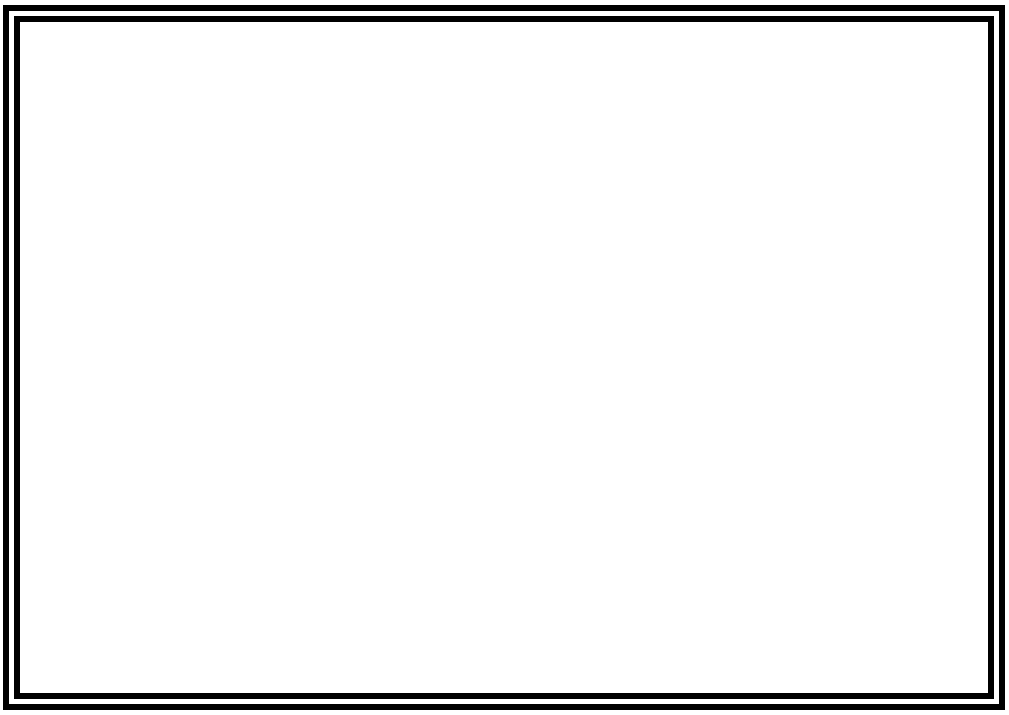

Figure . The 1995 YCC crew. Left to right: Justin Dean, Brian Borden, Duane Fish, Elizabeth Morse, Cristal Fimbres, and Ashlee Hill. JD 07/95

During the 1995 YCC program, the crew completed the following projects:

1. Painted the water tank and hatchery pond structure at Gallagher Fish Hatchery, the YCC Bunkhouse and fence posts.
2. As part of the refuge's Integrated Pest management Program, the crew removed several stands of Scotch Thistle, Whitetop and Russian Knapweed.
3. Completed many fencing projects including: enclosing the domestic water tank, fence repair and reconstruction, construction of 1 mile of fence and removal of fence in several locations.
4. Rock removal and trail maintenance around refuge headquarters.
5. Assisted refuge biologist in trapping and banding geese.
6. Set up camp, blinds, holding pens, and dug latrines for Hawkwatch International's raptor research station in the Goshute Mountains (spike camp).
7. Cleaned shop, storage buildings and vehicles.
8. Completed CPR and first aid training.
9. Participated in environmental education provided on and off site by refuge staff and crew leader.

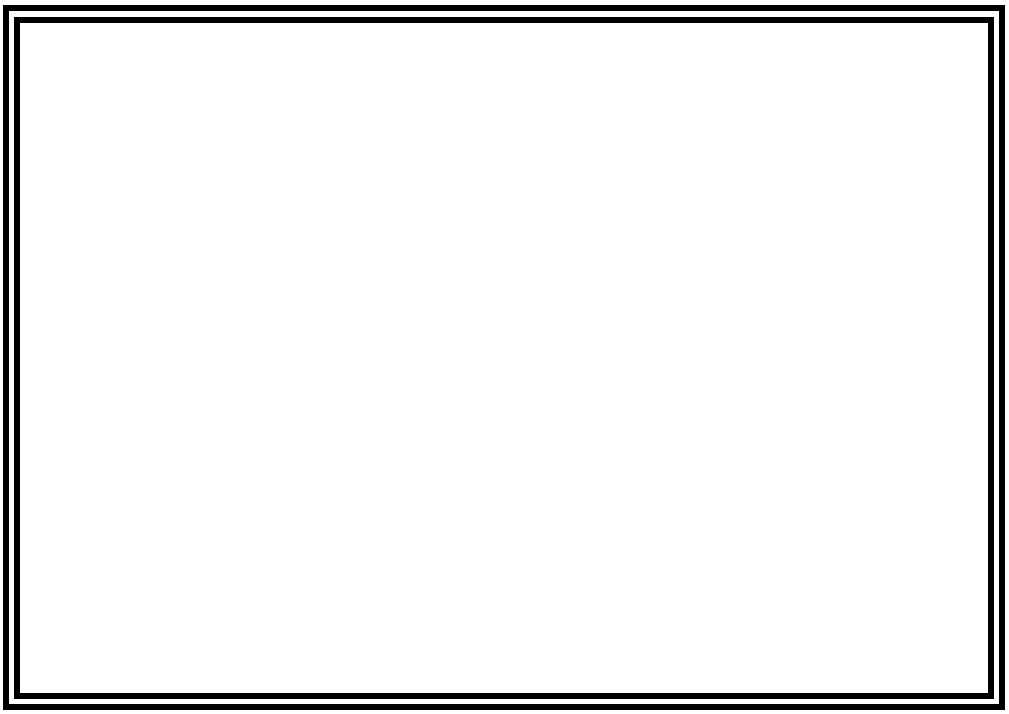

Figure . Fence construction and maintenance was one of the primary activities conducted by the 1995 YCC crew. JD 07/95

4. Volunteer Programs

Because of inadequate FTE allocation and salary funding, the time contributed by volunteers is a valuable asset to the refuge. In 1995, fifteen volunteers (including other Federal and State employees) contributed 852 hours.

Mary and Farrell Reische arrived in June and contributed 656.5 hours. Farrell's knowledge and skill with electrical, plumbing, carpentry, concrete work, and equipment operation was a great asset to refuge operations and maintenance. Mary's clerical, computer, and administrative skills contributed greatly to the administration of the refuge.

Jeanne Tinsman arrived in June and provided valuable assistance with refuge biological programs. Jeanne contributed 69 hours conducting bird surveys, environmental education, assisting with goose banding, establishing a MAPS station at the refuge, and entering data into Procite.

Ed Partee, Assistant Manager of the nearby Gallagher Fish Hatchery, contributed 39 hours assisting with the refuge prescribed fire program.

Local resident, Lois Goff contributed 25 hours of biological data entry work.

Eight volunteers participated in the 1995 Christmas Bird Count. Along with refuge staff, they braved the cold to count 61 species and 1,906 individual birds. The participants included personnel from the Elko District Bureau of Land Management (3), the U.S. Forest Service (3), and the Nevada Department of Wildlife (1), and one resident of Elko.

5. Funding

Operations and Maintenance base funding decreased in 1995 (Table 3).

The refuge fire budget was funded at $4,900. This funding was used to purchase tools, small equipment, personal protective equipment, and to conduct maintenance on fire equipment and the FTS fire weather station. Funds designated for prescribed fire were $5,500 earmarked from 1261 base funding.

The refuge received $5,000 in subactivity 6860. These funds were used to administer the grazing and haying program.

Table. Station funding levels (000's) for Ruby Lake NWR.

FY	1261	1262	6860	9110	9120	1120	Total
1995	222.0	137.0	5.0	4.9	0	0	369.70
1994	255.0	139.0	5.0	1.0	12.0	0	412.00
1993	191.0	100.6	5.0	0	8.0	1.0	305.60
1992	191.0	78.0	5.0	0	17.0	3.0	294.00
1991	191.5	137.0	5.0	0	2.0	0	335.50

Subactivity 1262 was funded at $137,800, which included four Maintenance Management System (MMS) priority projects (Table 4). All MMS Priority projects were completed, except for The East Marsh Project. The State classified the levee as a dam and required compaction levels of 90%. This requirement nearly doubled the cost of the project and will delay its completion until 1996.

Table. MMS projects funded at Ruby Lake NWR in 1995.

Project No.	Description	Funded Amount
91014	Fire Protection System	71.0
93001	Public Restrooms	19.6
95005	East Marsh Restoration Project	60.0
91010	Dike Rehabilitation	10.5
	Total	152.1

6. Safety

Radon Detectors were installed in the office and refuge quarters.

A safety railing was installed on the water control structure located on the Collection Ditch at Brown Dike. The railing will help prevent small children from falling into the Collection Ditch and being swept into the structure.

Fire breaks were disced around the refuge headquarters and residences as well as the Gallagher Fish Hatchery residences.

Furnaces and wood stoves were inspected and maintained in preparation for winter.

Fire extinguishers were inspected and maintained as necessary. The data base used to track fire extinguisher maintenance needs was brought up-to-date.

Refuge staff and the YCC crew received certification in basic First Aid and adult CPR.

There were no lost time accidents this year involving service personnel or volunteers.

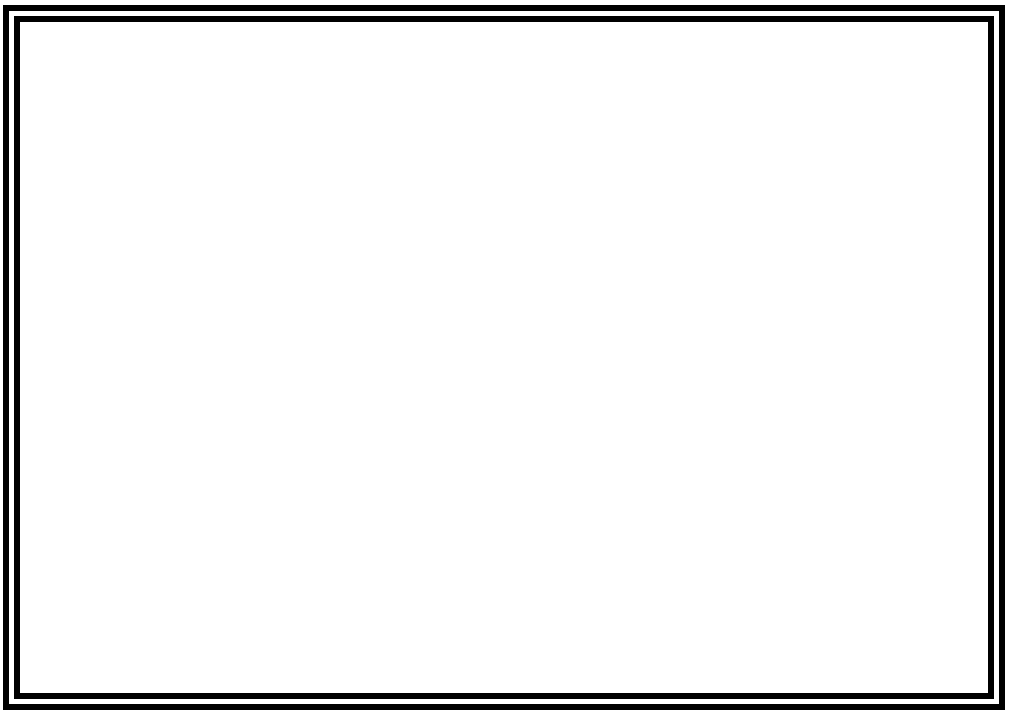

Figure . Safety railing was constructed to prevent accidents. KD 12/95

8. <u>Other</u>

Refuge Manager Pennington attended several meetings with representatives from the

Humboldt National Forest of the U. S. forest Service, Elko District of the Bureau of Land Management, Elko and Wells Chambers of Commerce, and the Nevada Commission on Tourism to continue planning efforts for the proposed multi-agency visitor center. Pennington continued to serve as chairman of the group.

Assistant Director John Dobel and Associate Manager Don Voros visited the refuge July 25-26 to conduct the annual review and inspection. Neither Mr. Dobel or Mr. Voros had visited the refuge previously. Their visit provided an excellent and much needed opportunity to acquaint these individuals with the gem refuge of Region 1.

F. HABITAT MANAGEMENT

1. General

The refuge encompasses a large variety of wetland and upland vegetation types, some of which are unique in the Great Basin high desert (Table 5). Large pristine wetlands are extremely rare in Nevada. Wetlands in Nevada (as well as much of the west) have been degraded or lost because of water diversion for agricultural purposes. Wetlands on the refuge are not impacted by water diversion and the refuge water supply is normally abundant and of excellent quality. During the recent drought the refuge was one of the few areas in Nevada that contained wetland habitat. Some of the upland habitats and springs on the refuge are also unique in the Great Basin. Extensive wet meadows are rare in the high elevation desert of Nevada. Saline meadows and grasslands, while not as rare as wet meadows, are dependent on springs and summer precipitation and contain a large number of native plant species. The refuge shrub steppe is a common but degraded plant community elsewhere in the Great Basin. Some of the shrub steppe habitat on the refuge has been impacted by past overgrazing. Soils and vegetation of these habitats are sensitive to disturbance and take a considerable amount of time to recover once damaged.

Table 5. Vegetation types found on Ruby Lake NWR.

Vegetation Type	Number of Acres	Percent of Vegetation Type
Open Water/Bulrush Marsh	15144.9	40.3
Alkali Playa	3598.4	9.6
Wet Meadow	2367.5	6.3
Dry Meadow	1879.4	5.0
Grassland	1188.4	3.1
Perennial Forbs	196.8	0.5
Sagebrush/Rabbitbrush	7316.1	19.4
Greasewood	5267.4	14.0
Saltbush	673.1	1.8
Total	37632.0	100.0

2. Wetlands

Wetlands on the refuge include permanently and seasonally flooded shallow marsh and infrequently flooded alkali playas. The average depth of the permanent marsh area is 3.5 feet with a range of 0.5 to 12 feet. Total wetland acres varies annually because of variability in annual snow pack in the Ruby Mountains. The maximum wetland acreage occurs in the spring and gradually decreases during summer to a minimum acreage in the fall. The

permanent marsh habitat consists of a mosaic of open water and emergent vegetation (hardstem bulrush predominantly). Wetland management units include the North Marsh, East Marsh, South Marsh, and five small marsh units delineated by levees and located on the west side of the refuge. More wetland acres were flooded in 1995 than in 1994, however, total flooded acres remained below average (Table 6).

Table 6. Estimated flooded acres in wetland units On Ruby Lake NWR in 1995.

Unit	Spring 1995	Spring Average[a]	Fall 1995	Fall Average[a]
West Marsh Units	1,240	1,240	1,240	1,240
North Marsh	3,000	6,800	7	2,245
East Marsh	440	1,755	11	1,400
South Marsh	7,000	7,300	7,000	7,000
Collection Ditch	25	25	25	25
Total	11,705	17,120	8,283	11,910

[a] Represents potential acreage during spring or fall with normal precipitation patterns.

Total flooded wetland acreage during 1995 remained below average, despite a wet winter and spring, as a result of the recent severe drought. The volume of water flowing from springs appeared to be near to above average during most of the year, and was above average during November and December because of above average temperatures. Cave Creek experienced high flows and some flooding in early June. Flynn and Hager Spring, which did not flow in 1994, flowed for two months in 1995. Flynn Spring began to flow in late April and stopped flowing in late September, which is about one month later than normal. Flynn Spring Creek also experienced some flooding in early June. Butte Spring in meadow unit II-B, located at the north end of the refuge, produced water briefly in June after an eight year absence.

For the eleventh consecutive year refuge wetlands continued to be negatively impacted by water shortage, although to a lesser extent than in previous years. Water output from springs contributing to the Collection Ditch during 1995 was 40 percent greater than during 1994 (Table 7). Other springs on the refuge also exhibited higher water output during 1995 than during 1994. Although the west marsh units (10, 13, 14, 20 and 21) were near desired management elevations during the spring, the North, East, and South marsh units did not reach desired management elevations and could not be maintained at desired management elevations throughout the year.

Because of an anticipated water shortage, the west marsh units 10, 13, 14, 20, and 21

received highest management priority for water delivery. Under this management action, only water in excess of that needed to maintain the five small marsh units at objective elevations is diverted into the other marsh units following the priorities set in the refuge Water Management Plan. From February through April the water elevations were increased or decreased to achieve desired management elevations for waterfowl nesting. Water elevations in the small marsh units were maintained at stable levels through June to prevent disturbance to nesting waterfowl. From July through September water elevations were allowed to decrease through evapotranspiration to enhance waterfowl foraging habitat. During late fall, the water elevations increased to desired management elevations. Much of the fall increase in water elevation is due to decreased evaporation and emergent plant transpiration, rather than increased spring flows. During winter, water was routed through the units to maintain adequate dissolved oxygen concentrations for fish.

Table 7. Inflow[a] to marsh units from the Collection Ditch on Ruby Lake NWR.

Year	Marsh Unit in acre feet							Total
	10	13	14	20	21	NS	SS	
1991	1140.58	922.84	1091.61	774.23	4380.30	8.92	3456.85[b]	11775.33[c]
1992	641.70	466.93	818.96	911.22	2229.69	63.23	3829.61	8961.34
1993	1236.77	831.82	481.16	866.92	2277.59	923.44	7185.03	13802.73
1994	1068.29	627.45	544.88	948.59	1713.38	14.94	6396.94	11314.47
1995	1050.96	597.75	494.76	457.77	2145.84	490.51	13630.99	18868.58

[a] Inflow in acre feet. Values do not represent inflow from adjacent marsh units.
[b] Flows measured for last 1/3 of year only.
[c] Incomplete data, see footnote [b].

During 1995 more water was provided to marsh units 10, 21, North Marsh, East Marsh, and South Marsh than in 1994 (Table 8). Less water was provided to marsh units 13, 14 and 20 in 1995 than during 1994 because of below average evaporation (Table 8). Water diversion to the East Marsh was kept to a minimum because of scheduled habitat enhancement work. During non-winter months, water in excess of that needed to maintain the small marsh units at desired management elevations, was diverted to the South Marsh.

During winter when the small marsh units were ice-covered, water was diverted from the Collection Ditch and routed to the North Marsh through marsh units 20, 14, 13, and 10, in

that order, to maintain sufficient dissolved oxygen concentrations for fish. Water was diverted to the South Marsh directly from the Collection Ditch and via marsh unit 21 when this unit was ice-covered. No water was diverted to the East Marsh during months when the small marsh units were not ice-covered.

During the recent drought, small isolated cattail (*Typha angustifolia* and *T. latifolia*) stands expanded and new stands pioneered rapidly in bulrush habitat in all marsh units. Many of these stands are located along levee roads. In some areas cattails are now the dominant emergent species, having successfully out-competed bulrush. The expansion of cattails may negatively impact over-water nesting duck species because of the loss of open water and the loss of bulrush which is thought to be a superior nesting substrate. Cattail is believed to be an exotic species on the refuge.

Table 8. Summary of water management in marsh units on Ruby Lake NWR during 1995.

Unit	Maximum Elevation	Minimum Elevation	Total Inflow[a] Acre Ft.	Total Outflow[b] Acre Ft.	Net Inflow Acre Ft.
10	5965.30 (5965.38)[c]	5964.86 (5964.70)	2099.90 (1917.56)	1421.24 (1149.06)	678.66 (768.50)
13	5965.38 (5965.66)	5964.48 (5964.40)	1190.98 (1261.28)	1141.89 (992.26)	49.09 (269.02)
14	5965.74 (5965.81)	5964.76 (5964.70)	706.26 (880.62)	326.54 (495.02)	379.72 (385.60)
20	5965.80 (5965.82)	5965.00 (5964.74)	459.2 (948.59)	248.82 (355.59)	293.62 (593.00)
21	5965.56 (5965.75)	5964.44 (5964.44)	2145.84 (1713.38)	1852.22 (1506.76)	293.62 (206.62)
North Marsh	5963.68 (5963.92)	5961.60 (5961.93)	1980.55 (1184.04)	0.00 (0.00)	1980.55 (1184.04)
East Marsh	5963.02 (5963.36)	5962.28 (5962.24)	601.46 (63.30)	0.07 (0.39)	601.39 (62.91)
South Marsh[d]	5964.66 (5963.59)	5962.24 (5961.06)	15566.64 (7710.55)	No Outflow	15566.64 (7710.55)

[a] Does not include unmeasurable spring flow within units.
[b] Does not include evapotranspiration.

[c] Total flows during 1994 in parentheses.
[d] Elevations as measured at the Main Boat Landing.

The draw-down of marsh unit 13 was again delayed because of habitat enhancement work in the East Marsh. This work required that the East Marsh remain dry, therefore unit 13 remained flooded to facilitate routing of water during winter.

The water elevation in unit 21 was intentionally maintained at a higher elevation in order to discourage California gulls from nesting in the unit. Since waterfowl use this marsh unit more for courtship and roosting activities than for nesting, the higher water elevation did not affect waterfowl use of the unit.

The southern one-third of the North Marsh was flooded during spring from water diverted from the small marsh units (winter flows). The unit was dry by mid August but received use by significant numbers of shorebirds and ducks during the spring and summer. In November, water was again diverted to the unit from the small marsh units. The south end of the North Marsh became shallowly flooded during early winter and provided excellent foraging habitat for waterfowl, especially Canada geese, mallards, and pintails. The significant use of this unit by wildlife demonstrates the value of providing water to the North Marsh rather than to the East Marsh which is choked by bulrush. Even though it has been flooded in past years, the East Marsh receives very little use by wildlife mostly because very little open water is available.

The East Marsh was intentionally kept dry (except for the barrow pits) during 1995 to facilitate habitat enhancement work. Construction of a levee at the south end of the unit began in August. As a result of being dry during the growing season, native grasses colonized areas of the unit which were subirrigated from water in the barrow pits. This type of habitat (similar to habitat produced from moist soil management) exists in the North Marsh which is flooded in winter. Shallow flooding of the East Marsh during winter has the potential to provide additional high quality fall foraging areas for waterfowl.

The maximum water elevation in the South Marsh occurred in early July, approximately 1.5 months later than in 1994. The maximum water elevation was 12.8 inches higher in 1995 and the minimum elevation in 1995 was 14.2 inches higher than in 1994. Despite higher water elevation during the year, the water elevation was below desired management elevation (Figure 11, next page). The South Marsh water elevation was the highest since 1990 and made significant progress towards recovery from the drought. During the canvasback nesting period, the water elevation increased 6.8 inches. Extensive production of sago pondweed continued in the South Marsh as a result of the drought-caused drawdown in 1992.

Much of the open water at the north end and at the southwest side of the South Marsh has become overgrown by bulrush. This area is approximately 3,500-4,000 acres of shallow marsh. The expansion of bulrush was likely accelerated by the long drought and has resulted in a significant loss of waterfowl nesting and foraging habitat. When the area contained

more open water it was used by waterfowl, especially canvasback, redhead, and ruddy ducks, for nesting and brood rearing.

5. Grasslands

Discussion within this section relates to all upland plant communities found on the refuge, including grasslands.

As the elevation of the land gradually increases and with increasing distance from the marsh, the moisture content of the soil decreases. This soil moisture gradient results in a variety of upland habitats. Wet meadows and alkali playas, which border the marsh, transition to dry meadows, then grasslands, and finally shrub steppe habitat (sagebrush and greasewood). Pinyon pine and juniper occur at higher elevations and are mostly confined to adjacent Forest Service and Bureau of Land Management administered lands.

Plant growth in 1995 began later than average because of prolonged winter conditions into the spring. As a result, total plant production in the meadows and grasslands was below average to near average. Vegetation production was highest and the active growth period the longest in the meadows adjacent to the marsh because of subirrigation. Plant production in meadow unit II-E, adjacent to the East Marsh, was average even though the marsh unit was dry.

Alkali playas are located mostly on the east side of the refuge and are partially vegetated by creeping wild rye and western wheatgrass (*Agropyron smithii*). These areas are shallowly flooded periodically in the spring from melting snow. When vegetated, playas provide excellent duck nesting habitat. During the flood years of 1984-86 the playas were flooded for most of each of the years which resulted in a complete loss of vegetation. The flood years were followed by drought years which prolonged revegetation of the playas. Because of abundant snow on the basin floor, the playas began revegetating in 1993. During 1995, the density of plants in the playas continued to increase and provided excellent duck nesting habitat.

? photo of vegetated playa

Several fencing projects were completed during 1995. The east end of the south fence in meadow unit I-E was relocated along the Collection Ditch to establish a barrier against wandering cattle. The short fence at the cattle guard on Brown Dike was also relocated along the Collection Ditch. The fence near the east side of marsh unit 21 was removed. The fence on the south side of Gravel Pit Pond in Unit I-J was removed. A fence was constructed around the domestic water tanks near the refuge headquarters. A one mile fence was constructed in meadow unit I-N to exclude cattle from grassland and shrub-steppe habitat. Remaining post were removed from the fence dividing units III-A and III-B.

7. Grazing

Upland units, consisting of meadows, grasslands and shrub-steppe habitat (sagebrush,

greasewood, rabbitbrush) are managed to provide a diversity of habitat (structurally and spatially) for a variety of foraging and nesting wildlife. Habitat management goals are achieved through non-use, prescribed burning, a four-year rest/rotation (three-season) grazing program, haying, and irrigation. Grazing was the dominant tool used for vegetation manipulation until 1992. Prior to 1992, grazing was implemented on 96 percent of the upland areas. Under the draft revised Upland Habitat Management Plan (1992), grazing is now implemented on 51 percent of the uplands, including meadows, grasslands and shrub steppe. Units withdrawn from the grazing program contain a majority of the shrub-steppe plant community which exhibit low levels of plant production. Because of disturbance-sensitive soils, grazing these areas caused a significant invasion of noxious plants including cheat grass and rabbitbrush.

One Special Use Permit (SUP) for grazing was issued to the Duval Ranching Company, a long-time permittee. Grazing was implemented on 9,539 acres in 1995 at a level of 2,264 AUM's (Table 9). The grazing fee was set at $4.24 per AUM which is a decrease of $0.29 per AUM from 1994. The revenue from grazing collected for 1995 totaled $9,599.02 and was $822.83 lower than the revenue collected in 1994.

Table 9. Summary of grazing on Ruby Lake NWR in 1995.

Unit	Acres	AUM's Prescribed	AUM's Actual	Season of Use[a]	Utilization[b]
I-A	78.7	53	55.45	S	Moderate
I-D	65.8	250	129.1154.	W	Hayed (Heavy)
I-E	55.3	100	25	LS	Light
I-F	136.9	0	17.60	LS	Light
I-F		300	249.97	W	Hayed (Heavy)
I-GH	251.8	135	119.57	S	Moderate
I-K	202.8	230	163.18	F	Moderate
I-L	190.8	135	106.30	S	Moderate
I-O	757.6	300	400.62	F	Heavy
II-F	364.6	150	103.00	LS	Moderate
II-F		0	53.67	S	Light (Trespass)
II-F		0	27.09	W	Light (Trespass)
II-H	688.0	100	9.809.63	S	Light
III-C	2,758.6	0	111.47	ES	Light (Trespass)
III-C		0	317.90	W	Moderate
III-D	3,619.0	380	250.65	ES	Moderate
III-D		100	36.83	F	Moderate
III-E	324.0	85	47.83	S	Light
V-E	45.1	53		S	Moderate
Total		2371	2263.92		

[a] Season of Use:	Early Spring (ES) = 15 April to 15 May, Late spring (LS) = 15 May to 15 June, Summer (S) = 16 June to 15 August, Fall (F) = 16 August to 16 October, Winter (W) = 15 October until hay consumed (~15 December)
[b] Utilization:	Light = 25-40 % utilization, Moderate = 40-65 % utilization, Heavy = 65-90 % utilization

8. Haying

Two to three of five meadow units are hayed annually to provide short grass foraging areas for Canada geese and a diversity of other wildlife. Haying removes dense overstory plant species to a consistent height which provides high quality foraging habitat for sandhill cranes and Canada geese during spring and summer. Large numbers of white-faced ibis and egrets are attracted to these meadows when they are under irrigation.

During 1995 only two of the five hay meadows were prescribed for rake-bunch haying. The grazing period in these units was 24 October to 21 November. A total of 379.08 AUM's were utilized in the hay units.

Irrigation of the hay meadows was initiated in late April and was terminated at the end of July. Vegetation production in meadow units I-C and I-E was good to excellent in both units. Only fair production of vegetation occurred in meadow units I-D and I-F because of the deteriorated condition of the irrigation system.

9. Fire Management

Prescribed fire is used primarily as a means of rejuvenating meadows and grasslands that are covered by dense, matted Baltic rush which restricts and retards vegetative growth. High water from 1983-86 flooded meadows caused heavy matting which greatly reduced productivity. Since 1991 prescribed fire has been used to restore the productivity of matted meadows. Fire also is used to enhance the establishment and production of forbs and grasses in meadows, grasslands, and shrub steppe uplands.

During 1995, only two of the seven planned prescribed fires were executed (Table 10). The prescribed fire objectives were achieved for both units but the acreage objective was only achieved for one unit; approximately two-thirds of meadow unit I-N was burned. Wet weather during the prescribed fire periods precluded execution of the remaining planned prescribed fires. Wildlife Biologist Mackay is qualified as a Type III Burn Boss.

Table 10. Summary of prescribed fires planned and executed on Ruby Lake NWR in 1995.

Unit	Date Burned	Acres	
		Prescribed	Achieved

I-A/V-E	--	60	0
I-I	--	110	0
I-N/South Marsh	4 October	750	265
II-B	--	190	0
II-C	--	310	0
III-C/South Marsh	--	840	0
V-A	--	21	0
So. Unit East Marsh	3 October	600	440
Total		2881	705

The south one-forth of the East Marsh was burned in an attempt to create open areas in the dense bulrush. The prescribed fire was conducted in the fall when fuel and peat were driest. A terra-torch was used in the ignition of the unit to create as much heat as possible with the expectation that this would ignite the peat (Figure ?). Peat fires were ignited in approximately 20 percent of the unit and burned until late November. Meadow unit I-N was burned to remove dense matted vegetation.

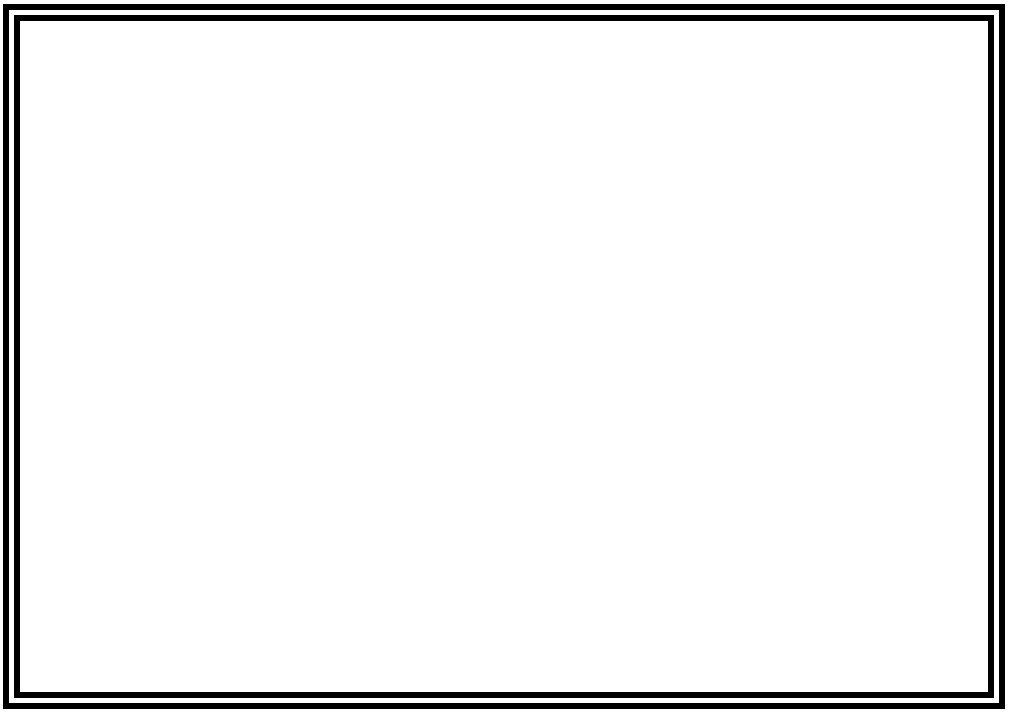

Figure . A terra-torch provided a means of quickly and efficiently igniting the East Marsh prescribed fire. JM 10/95

We received assistance from fire crews from the Bureau of Land Management Ely District on both prescribed fires, and from the USFS Humboldt National Forest and Nevada Division of Forestry (NDF) each on one fire. The BLM provided one light and one heavy engine and their terra torch that was used in the ignition of the East Marsh fire. The USFS provided two firefighters and NDF provided two firefighters and one engine. The support provided by these crews was critical to executing the fires. Interagency assistance is essential for safely executing larger prescribed fires because the refuge is not staffed adequately. The lack of available refuge fire-qualified staff limits the number of prescribed fires we can safely execute.

The refuge maintains interagency agreements, through the Nevada Interagency Fire Agreement, for fire suppression and other fire-related business with the Bureau of Land Management, the Forest Service, and the Nevada Division of Forestry. Operational plans are drafted annually which detail our initial attack responsibilities. Refuge staff are often given the opportunity to serve on wildfire details but must decline because of the refuge workload.
The refuge is the only federal land management agency that has fire vehicles and fire-trained personnel in Ruby Valley. Because the nearest federal or state wildfire suppression resources are 1.5 hours away, qualified refuge staff are dispatched by the Elko Interagency Dispatch Center (EIDC) and the Ely Interagency Coordination Center to wildfires and other emergencies in Ruby Valley and adjacent valleys.

A wet spring and summer resulted in abundant grass production in northeast Nevada. This delayed the fire season, but high intensity wildfires resulted because of the amount of fine fuels present in the sagebrush. Refuge staff responded to 7 reports of wildfires in our initial attack response area . The first two wildfires we responded to occurred on 23 August, three

occurred in September, and two occurred in October. The first fire we responded to was also the largest wildfire in Ruby Valley and one of the largest in Elko County (figure). The Battle Creek fire burned over 11,000 acres of Forest Service and private land. This lightening fire was located 13 miles north of the refuge and during it's two day siege threatened numerous structures, however only a few minor outbuildings were lost. In early September a small lightening fire occurred on the refuge but was quickly extinguished by rain. Three small fires occurred within 0.5 miles of the refuge boundary and were quickly contained by refuge staff.

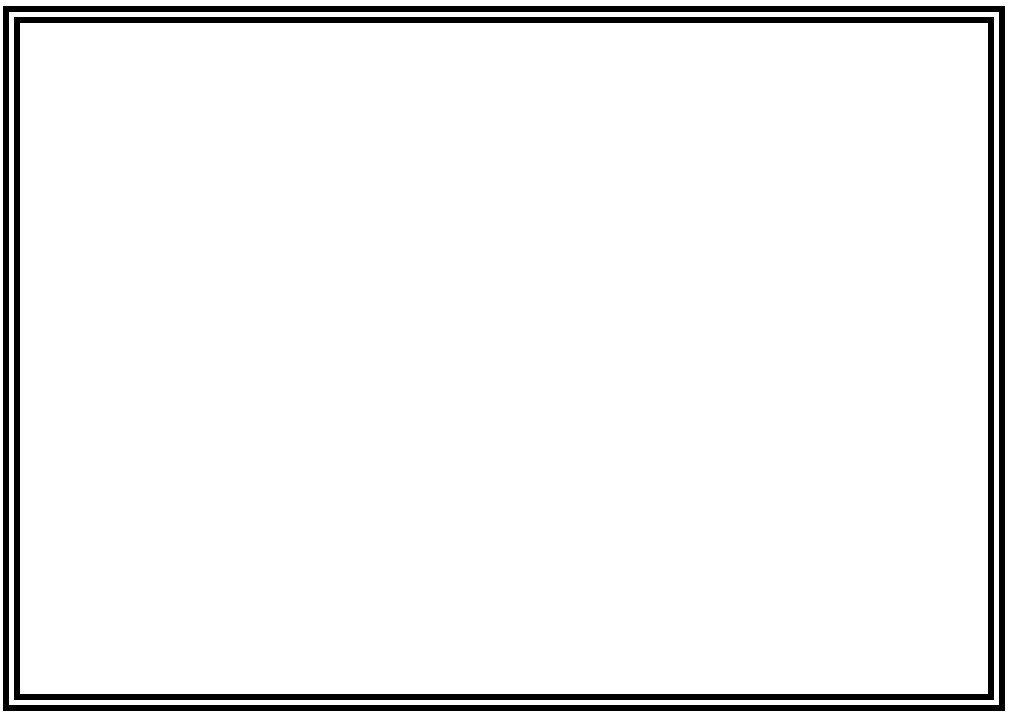

Figure . The Battle Creek fire was pushed through dense brush by strong winds. JM 08/95

During 1995, three permanent staff and one refuge volunteer maintained basic fire qualifications which allowed them to execute prescribed fires and respond to local wildfires. Two staff members and the volunteer were qualified as Type 2 firefighters and one staff member was qualified as a Type 4 Incident Commander.

Refuge fire vehicles include a 1987 Chevrolet dual-wheel, 1 ton, 4X4 pick-up truck, which carries a 200-gallon slip-on pumper unit, and a 1991 Dodge, 1.5 ton, 4X4 truck, equipped with a 250 gallon tank, pump and fiberglass utility bed (similar to BLM light engines). The 1987 fire truck and pumper unit has not been reliable for the past three years and was taken out of service during most prescribed fires during 1995 because of equipment failure. The refuge water tender consists of a 1000-gallon unit which slips onto our 1993 Ford 5 yard dump truck. These fire vehicles are invaluable to our prescribed fire program, critical for protection of refuge resources from wildfire, and essential for participation in interagency fire suppression activities.

In 1994, the refuge was offered and accepted an Associate Membership in the EIDC, which allows us to participate in fire-related business matters in this area without the obligation of financially supporting the EIDC operation. Wildlife Biologist Mackay represents the refuge in the EIDC Operations Group, which consists of Fire Management Officers from the Bureau of Land Management, the Humboldt National Forest, the Nevada Division of Forestry and the Bureau of Indian Affairs. The Group also functions as the MAC (Multi-Agency Coordination) group and is convened when local fire planning levels (similar to national fire preparedness levels) are three or greater.

Firebreaks are maintained each year around refuge headquarters and the nearby Gallagher Fish Hatchery (NDOW facility) as a precautionary measure against wildfires. Local residents (i.e. Gallagher Fish Hatchery personnel) comprise the crew for the Ruby Valley #3 Volunteer Fire Department. A 750-gallon fire truck owned by Nevada Division of Forestry is stationed at the Gallagher Fish Hatchery and is often used as a water tender and a back-up engine when we execute prescribed fires on the refuge.

10. Pest Control

Noxious weed infestations remain a moderate and persistent problem, primarily because of a lack of control efforts. Prior to 1991, hand control methods had generally prohibited infestations from increasing. Once confined to six to eight small areas, noxious weed infestations have expanded during the past five years on the levees surrounding the small marsh units, the spoil bank along the Collection Ditch, and in many of the upland units.

Refuge Pesticide Use Proposals were approved for the use of Rodeo (Glyphosate) and Weedmaster (Banvil plus 2,4-D) to control white-top (hoary cress), Russian knapweed, Canada thistle, Scotch thistle and green rabbitbrush. The biological control program that utilized insects was terminated in 1995. There have been no observations of insect over-winter survival since the program was initiated in 1991 and the program was considered a failure. Naturally occurring populations of rust disease and lace bugs were again observed on Canada thistle in 1995. Although not widespread on the refuge, these biocontrol agents are useful in our war on weeds.

No herbicide was applied on the refuge in 1995 because of a change in staff. Whitetop and Russian knapweed were removed by hand from the Collection Ditch levee and from around the Horse Barn structure by the YCC crew. The YCC crew also removed by hand Scotch thistle from the Brown Dike. Canada thistle was mowed on approximately 3.5 miles of levee roads (edge of road only) in July. A second mowing treatment was needed to prevent flowering and seed development, but was not conducted.

11. Water Rights

The water rights adjudication process was initiated in 1990 when the appropriate documentation for Ruby Lake NWR was submitted to the State of Nevada Water Resources Engineer. In early 1992, the Office of the State Engineer was requested to determine if any valid water rights existed within the refuge boundary. The State Engineer found that the refuge has never held any state appropriated water rights. During 1993, the Nevada State legislature approved funds for water rights adjudication. This opened the door for the State Engineer to begin the adjudication process. Numerous water rights applications were submitted in 1994 to the Nevada State Engineer. To date, the State of Nevada has not taken any action on the applications.

G. WILDLIFE

1. Wildlife Diversity

Because of the rarity of wetlands in the Great Basin region, the refuge is a magnet for a wide diversity of wildlife species. Management of wetland and upland habitats is primarily directed towards providing high quality foraging and nesting areas for waterfowl and greater sandhill cranes. Many other wildlife species benefit from this effort including egrets, herons, shorebirds, raptors, other water-dependent bird species and songbirds, as well as many mammal species because of similar habitat preferences. There are 207 migratory and resident bird species which utilize the refuge. An additional 23 bird species are observed on the refuge infrequently. Mammals found on the refuge include many rodent species, mule deer, pronghorn, muskrats, rabbits and coyotes. The leopard frog, and gopher, garter, and rattle snake occurs on the refuge; however, a complete species list of reptiles and amphibians has not been compiled for the refuge.

2. Endangered and/or Threatened Species

Bald eagles are regularly observed on the refuge and throughout Ruby Valley during winter months. One to two adult bald eagles was often observed perched in a cottonwood tree located near Bressman Cabin. This tree remains a preferred traditional roost site. At least two different bald eagles were observed on the refuge during fall migration.

Following a peregrine falcon introduction program on the refuge from 1984 to 1989, falcons were observed annually through 1990. No sightings of peregrine falcons have occurred since that time.

3. Waterfowl

The refuge is an important production area for waterfowl and also attracts large numbers of migrating waterfowl from both the Pacific and Central flyways. The refuge is primarily important to nesting canvasbacks and redheads. There are 13 other species of waterfowl which nest on the refuge and 10 species which utilize the refuge during migration. The South Marsh had the highest density of nesting canvasbacks in North America until their recent population decline.

Spring waterfowl populations peak generally in April as breeding birds arrive and as migrant birds move through the area. Fall migrating waterfowl generally begin arriving as early as mid-August and the population peaks generally during September-October. Most waterfowl move south once the marsh freezes. During fall, large concentrations of waterfowl utilize the large shallow open water areas of the South Marsh. The shallow water provides access to aquatic invertebrates, sago pondweed tubers, and other submergant aquatic vegetation. During winter, the few remaining ducks, geese, and swans are confined to open water on the Collection Ditch, spring ponds, and small shallow areas where flowing water inhibits ice

formation.

In 1995, the estimated spring waterfowl population on the refuge peaked in April at 7,792 birds, which was 8.1 percent higher than the estimated peak spring population in 1994. The fall population on the refuge peaked at 6,846 birds in October which was 69.3 percent lower than in 1994. The fall population on the refuge was lower because the majority of birds in south Ruby Valley were using Franklin Lake. The total number of waterfowl using south Ruby Valley wetlands was 54,393 with 88.9 percent of the population using Franklin Lake. Total waterfowl use-days in 1995 were 41.2 percent less than use-days in 1994 and 31.9 percent below the 10-year mean (Table 11). The lack of a normally high population on the refuge during the fall (birds used Franklin Lake) contributed completely to the low use-day totals.

The estimated waterfowl breeding population in 1995 was 4.8 percent greater than in 1994 and 6.7 percent below the 10-year mean (Table 11). Estimated waterfowl production in 1995 was 20 percent below estimated production in 1994 and 38.9 percent below the 10-year mean. Waterfowl production was 71.4 percent below the desired management objective in 1995.

Table 11. Estimates of waterfowl breeding population, production, and use-days on Ruby Lake NWR.

Population	1992	1993	1994	1995	10-Year Mean	Objective
Trumpeter Swan						
Breeding	5	4	5	6	6	None
Pairs	1	5	9	5	7	12
Production	6977	7288	9723	9140	6477	None
Use-days						
Canada Goose						
Breeding	121	105	132	250	148	None
Pairs	180	110	190	90	313	600
Production	73102	38593	89344	90273	51317	100000
Use-days						
Ducks						
Breeding	2804	3219	3129	3254	3608	None
Pairs	4064	4546	4600	3746	5964	12800
Production	2045916	2468915	2639315	1551124	2418042	2050000
Use-days						
Total						
Breeding	2930	3328	3266	3510	3762	---

Pairs	4245	4661	4799	3841	6284	13412
Production	2125995	2514796	2738382	1650537	2475836	---
Use-days						

a. Swans

Trumpeter swans were originally transplanted to the refuge from Red Rock Lakes NWR in southwestern Montana between 1947-58. A successful resident breeding population was established on the refuge. During winter a small number of migrant swans from unknown locations use the refuge.

The resident trumpeter swan population is very small but appears to be stable. Despite the annual production of young, the population is not increasing because the young do not remain here following their first winter. It is not known where the swans are relocating. Presumably, the young swans are migrating north with birds that winter on the refuge.

Six swan pairs initiated nesting on the refuge in 1995; one pair each in west marsh units 10, 13, and 14, and three pair in the South Marsh. The pair in marsh unit 10 hatched two but only fledged one cygnet and one pair in the South Marsh hatched and fledged four young. The pairs in west marsh units 13 and 14 and two pairs in the South Marsh were unsuccessful. Swan production in 1995 remained short of meeting the desired management objective (Table 11).

Tundra swans are observed briefly in south Ruby Valley during fall migration and in winter. Their arrival is dictated by weather conditions in Alaska and Canada and the duration of their stay is usually less than two weeks. In November approximately 50 tundra swans were observed.

During January, 41 trumpeter swans were observed on the refuge. In October, 21 swans were observed on the refuge and 15 swans were observed on Franklin Lake. During December, 44 swans were observed on the refuge. Swan use-days in 1995 were six percent below use-days in 1994 and 29.1 percent above the 10-year mean (Table 11). Much of the increase in use-days is attributed to a larger winter swan population.

b. Geese

The Canada goose is the only goose species utilizing the refuge year-long. Greater white-fronted geese and snow geese have been observed migrating through Ruby Valley. White-fronted geese have not been observed since 1990. Although no snow geese were observed on the refuge in 1995, approximately 2,500 geese utilized Franklin Lake during November and December.

The Canada goose population generally increases during winter, peaks prior to the nesting season and declines after broods fledge in August, when many of the family groups leave the refuge. Although grazing is utilized to provide short grass foraging areas during the summer, the geese are apparently attracted to mowed hay meadows located on ranches in Ruby Valley. Their departure may also be in response to high levels of predator pressure.

The peak goose population in 1995 was higher than the peak population in 1994. The population peaked at 514 birds in April with a low of 32 birds in October. Goose use-days

in 1995 were one percent higher than in 1994, 43.1 percent higher than the 10-year mean, and 9.7 percent below desired management objective (Table 11). Goose production declined severely in 1995 because of poor nest success and poor brood survival. Production in 1995 was 52.6 percent less than in 1994 and 71.2 percent below the 10-year mean (Table 11). Goose production remained well below the desired management objective.

c. Ducks

The marsh and meadows on the refuge are managed to provide high quality nesting habitat for 13 duck species. The primary importance of the refuge is to provide nesting habitat for canvasbacks and redheads in vast stands of bulrush located in the South Marsh where the majority of diving duck nesting occurs. The South Marsh holds the highest concentration of nesting canvasbacks west of the Mississippi River.

Duck populations began increasing in March with the arrival of early nesting species and early spring migrants. The estimated spring duck population peaked in April as migrants moved through and as additional nesting ducks arrived. The duck population then declined in mid-summer as non-breeders, males, and unsuccessful females moved to other locations to molt. The estimated fall duck population peaked in October with the arrival of migrant birds. During late December the majority of ducks departed the refuge which is much later than normal.

Duck use-days in 1995 were 41.2 percent lower than use-days in 1994, 35.8 percent below the 10-year mean, and were 24.3 percent below desired management objective (Table 11). Dabblers accounted for 939,401 use-days in 1994; 40.8 percent lower than use-days in 1994. Divers accounted for 726,170 use-days in 1995; 31 percent lower than use-days in 1994.

The duck breeding population in 1995 was 3.8 percent higher than in 1994, 9.8 percent below the 10 year mean, and 53.4 percent below desired management objective (Table 11). The number of dabbler pairs increased slightly while diver pairs decreased slightly as compared from 1994 (Table 12). Despite a larger duck breeding population, production in 1995 was lower than in 1994 mostly due to prolonged winter weather. Duck production in 1995 was 18.6 percent lower than in 1994, 37.2 percent below the 10-year mean, and 70.7 percent below the desired management objective (Table 11 and 12). Only gadwall, American wigeon, and northern pintail had higher production in 1995 as compared to 1994 (Table 12).

Table 12. Estimated duck breeding population and production on Ruby Lake NWR.

Species	Prod. Obj.	1993 Pairs	1993 Young	1994 Pairs	1994 Young	1995 Pairs	1995 Young	10-Yr Mean Pairs	10-Yr Mean Young
Mallard	--	232	132	258	348	235	132	281	484
Gadwall	--	598	982	434	694	587	704	724	1105
A. Wigeon	--	23	15	43	39	45	58	37	41
G-w Teal	--	133	89	45	41	0	0	35	29
Cin/B-w Teal	--	372	560	381	610	441	529	512	809
N. Shoveler	--	122	169	152	182	162	170	158	228
N. Pintail	--	179	120	181	217	279	251	112	166
Total Dabblers	5500[a]	1659	2067	1494	2131	1749	1844	1860	2862
Redhead	2000	484	1060	469	694	395	679	560	932
Canvasback	3500	488	354	534	833	547	427	547	1116
Lesser Scaup	--	283	658	288	507	277	499	258	453
R-n Duck	--	68	64	34	38	12	18	39	55
Ruddy Duck	--	237	343	310	397	274	279	343	546
Total Divers	8000[b]	1560	2479	1635	2469	1505	1902	1748	3102
Total Ducks	13500	3219	4546	3129	4600	3254	3746	3608	5964

[a] Production objectives not established for specific dabbler species.
[b] An objective level of 2500 established for species other than redhead and canvasback.

4. Marsh and Water Birds

The refuge provides wetland habitat for many other wetland dependent bird species. Greater sandhill cranes, which are part of the Lower Colorado River Valley population, use refuge, state, and private land in Ruby Valley for nesting and foraging. The cranes began arriving on the refuge in late February; earlier than normal because of mild spring weather.

During April, 19 crane pairs were counted on nesting territories. The number of colts that hatched on the refuge decreased from last year and only one of the eight colts survived to fledgling age (Table 13). It is believed that extremely high predator pressure has resulted in extremely poor crane production for many years. Only after the recent crash in the coyote population have any colts survived on the refuge. However, because of an abundant prey selection, a disproportionately higher coyote population exists on the refuge compared to off refuge areas. Until a predator management program is initiated on the refuge, poor sandhill crane colt survival is expected.

Table 13. Estimates of the sandhill crane breeding population and production on Ruby Lake NWR.

Year	Pairs	Colts		Production Objective
		Hatched	Fledged	
1984	29	5	2	48
1985	34	3	3	48
1986	25	3	0	48
1987	15	2	0	48
1988	15	0	0	48
1989	12	5	0	48
1990	10	0	0	48
1991	15	2	0	48
1992	13	17	0	48
1993	15	5	0	48
1994	15	16	2	48
1995	19	8	1	48
Mean	18	5.3	0.6	48

Three grebe species: Western, eared, and pied-billed, continue to nest on the refuge, although at low levels. The Clark's grebe has been observed, but it is not known if this species nests on the refuge. Double-crested cormorants and great egrets began nesting on the refuge in 1989 and continued to use the refuge during 1995. Both species, in addition to snowy egrets and white-faced ibis, nested in one colony located in marsh unit 14. A second smaller ibis colony located in the South Marsh was also utilized. Irrigated meadows which are managed to provide foraging habitat for sandhill cranes and Canada geese also provided high quality foraging areas for these wading species.

Great-blue herons and black-crowned night herons also nest on the refuge. These species nested in the colony located in marsh unit 14. Cattle egrets continue to utilize the refuge during summer where they are observed foraging in the meadows. American bitterns also nest on the refuge.

White pelicans are infrequently observed on the refuge, however, none were observed in 1995. Approximately 40 pelicans were observed on Franklin Lake in September.

During 1995, coot use-days were 10 percent below use-days in 1994 and 55.9 percent below the 10-year mean (Table 14). Although the estimated breeding population was higher in 1995 than in 1994, production was lower in 1995 than in 1994. Coot production in 1995 was 22 percent lower than in 1994 and 67.2 percent below the 10-year mean (Table 14).

Table 14. Estimated coot breeding population, production, and use days on Ruby Lake NWR.

	1991	1992	1993	1994	1995	10-Yr Mean
Breeding Pair	1925	1011	1135	858	1028	3053
Production	2888	1929	1978	1647	1285	3917
Use Days	1976200	830020	662323	723400	650962	1476220

5. Shorebirds, Gulls, Terns and Allied Species

The majority of shorebird species using the refuge are migrants. When alkali playas are seasonally flooded, large numbers of shorebirds forage in these high quality areas and some species nest in the adjacent uplands. Water was diverted to the North Marsh during winter which provided the only high quality spring shorebird habitat in northeast Nevada in 1995 because other alkali playas in the region were not flooded. The North Marsh received use by large numbers of shorebirds, especially American avocets, during spring and summer. Of the eight shorebird species which nest here (see wildlife checklist), long-billed curlew, killdeer, and common snipe are the most numerous since they are less dependent on shallow wetlands.

Three gull species use the refuge but only California gulls nests here. During 1995, approximately 20 pairs nested on islands in marsh unit 21. These birds hatched young but none survived to fledge. The number of breeding California gulls has remained nearly constant since they began nesting here in 1990.

Both Forester's and black terns nest on the refuge. A few Caspian terns are observed during the summer, but this species does not nest on the refuge. Black terns are more numerous than Forester's terns and both species nest in the small marsh units or occasionally in the South Marsh. Following a winter-like storm with high winds in June, all terns abandoned their nests and departed the area. Few terns were observed on the refuge during the remainder of the summer.

6. Raptors

A variety of raptor species are present in the area during all months of the year. The presence of high quality marsh and upland habitat on the refuge, with a seasonally abundant prey supply located near a source of nesting habitat creates an ideal environment for raptors. The more common nesting species include turkey vulture, red-tailed hawk, northern harrier and American kestrel. Golden eagles, prairie falcons, great-horned owls and short eared owls also nest in the area and utilize the refuge throughout the year. Rough-legged hawks are common winter residents on the refuge. Ferruginous and Swainson's hawk are occasionally observed on the refuge and in Ruby Valley during the nesting season but are not

known to nest on the refuge.

7. Other Migratory Birds

Because of the harsh winter climate in Ruby Valley and northeast Nevada, most bird species use the refuge during migration, and nesting species are only present during spring, summer and fall. A total of 78 non-waterfowl or non-marsh bird species nest on the refuge in the wet meadows, grasslands, shrub steppe, and riparian areas.

In cooperation with the Migratory Bird and Habitat Research Laboratory, the annual Breeding Bird Survey was conducted along a route established on the southwest side of the Ruby Mountains. The survey provides important information on annual occurrence of nesting species and breeding bird population trends in the Great Basin. A total of 30 species were observed during 1995. The Brewer's sparrow was again the most abundant species followed by sage thrasher, sage sparrow, western meadowlark, vesper sparrow, and mountain chickadee. This route has been surveyed by various refuge staff since 1965.

To gather information on bird species wintering in the area, the refuge has hosted the Audubon Christmas Bird Count since 1978. On 19 December, 11 participants conducted the count on a clear but cold day. A total of 61 species were observed by the participants and 1,906 individual birds were counted. New records were set for the number of species observed and the total number of birds counted.

8. Game Mammals

Mule deer are the most abundant big game mammal species on the refuge and are frequently observed throughout the year. The refuge meadows, grasslands and shrub steppe provide a small amount of winter range habitat for mule deer migrating south along the eastern flank of the Ruby Mountains.

Pronghorn antelope were released on land administered by the Bureau of Land Management near the southeast side of the refuge in 1988 by the Nevada Division of Wildlife in an effort to increase the size of the local herd. Since the release, pronghorn have been frequently observed during aerial waterfowl surveys and occasionally observed during ground excursions on the refuge. The pronghorn are attracted to the refuge because of the availability of forage and water, especially during the past drought years. Some of the boundary fences have been modified to facilitate access to the refuge by the pronghorn. During 1995, at least five different herds of pronghorn, with a herd size numbering from 4 to 38, were observed on the refuge. At least eight young were observed on the refuge in 1995.

10. Other Resident Wildlife

Very few bird species remain here throughout the entire year. The more common resident species include northern flicker, horned lark, pinyon jay, black-billed magpie, common

raven, plain titmouse, bushtit, and dark-eyed junco. Although not common, sage grouse utilize the refuge throughout the year. In cooperation with the Nevada Division of Wildlife, Wildlife Biologist Mackay conducts annual lek ground surveys during the spring. At least one viable lek site is located on the west side of the refuge on Forest Service administered land. There is the potential that another lek is located at the south west end of the refuge but this site has not been confirmed. During 1995, 11 separate observations were made of sage grouse on the refuge or at the lek site with the number of birds observed ranging from 1 to 16. The sagebrush steppe area near the Indian Creek gravel pit is the core use area of the sage grouse.

Other resident wildlife includes a large variety of small mammals. Coyotes are abundant in south Ruby Valley and several dens are located on the refuge. Because of the abundance and density of prey on the refuge, it is likely that the density of coyotes on the refuge is higher than the surrounding area. Consequently, because of the high coyote population level and the increased demand for food by their offspring, wildlife dependent on habitats managed by the refuge are being negatively impacted by these predators. Striped skunks were first documented in south Ruby Valley during 1992. They appear to prefer Cave Creek near the refuge headquarters and the Gallagher Fish Hatchery. To our delight no skunks have been observed in other areas of the refuge.

Blacktail jackrabbits are the most abundant rabbit species and provide an important food resource for many birds of prey and coyotes. During 1995, few blacktail jackrabbits were observed. The jackrabbit population has remained very small since their crash in 1994.

11. Fisheries Resources

Historically, the small relict dace (*Relictus solitarious*), endemic to northeast Nevada, was abundant in the marsh but drastically declined following the introduction of largemouth bass in 1932-33. The relict dace now occurs only in a few isolated spring ponds and spring channels. A study conducted during 1994 by the Nevada Division of Wildlife (NDOW) found that the relict dace population on the refuge has further declined since the last survey conducted in 1982. Some of the springs where the relict dace was previously observed are dry due to the drought or are overgrown. Additionally, there appears to have been much hybridization with speckled dace. The speckled dace were introduced as a forage fish for bass. Although the relict dace has not been extirpated from the refuge, the population is in need of immediate enhancement action to assure their long-term viability. Only two other valleys in this region contain populations of relict dace but they are vulnerable to loss because the land is not protected.

The South Marsh is the primary management area for bass, although bass are found in the small west marsh units. At one time the refuge was listed in a popular sporting magazine as one of the top ten bass fishing locations in the United States. Following several years of high fishing pressure the bass population began showing signs of over-harvest. Regulations were implemented by NDOW to facilitate growth of bass to spawning size before they were harvested, but were executed after the population was significantly reduced. Poor habitat conditions prevailed during 1992 and 1993 as the South Marsh was mostly dry and few bass

survived the harsh winter. Because the widespread drought had caused a significant draw-down of most reservoirs and a reduction in their associated fisheries, NDOW only obtained a few breeding-age bass for restocking in the South Marsh.

NDOW frequently plants trout on the refuge, primarily in the Collection Ditch, South Marsh and large spring ponds along the west side of the refuge (Section 12). Trout found on the refuge include eastern brook, cutthroat, rainbow, and brown trout. A hybrid of brown and brook trout, called the tiger trout, is no longer produced by the hatchery. Until 1991, the tiger trout was planted exclusively on the refuge and to date the record of the largest fish taken is from the refuge. In 1995, a second trout hybrid called a cutbow was planted on the refuge. The cutbow is a cross between a cutthroat and a rainbow.

12. Wildlife Propagation and Stocking

The existence of the trout fishery at the refuge is dependent on annual stocking. All trout stocked on the refuge are reared at the state-operated Gallagher Fish Hatchery located on the refuge. The total number of fish stocked on the refuge in 1995 was 10.4 percent more than the number of fish stocked in 1994 (Table 15). Breeding age bass were again planted in the South Marsh in an effort to rebuild their population rapidly. Bass are not normally planted on the refuge because they reproduce in the marsh.

Table 15. Game fish stocked by the Nevada Division of Wildlife on the refuge.

Fish	1990	1991	1992	1993	1994	1995
Rainbow	24,505	106,197	263,322	71,362	38,128	47,309
Brown	4,613	4,664	1,875	1,439	1,639	1,561
Tiger	6,016	8,900	9,896	14,545	0	0
Brook	6,000	5,854	6,500	0	11,169	5,100
Cutthroat	0	0	5,027	0	0	520
Cutbow	0	0	0	0	0	4,288
Bass	0	0	0	30,839	2,001	319
Total	41,134	125,615	286,620	118,185	52,937	59,097

15. Animal Control

The muskrat population during 1995 was at a low enough level that trapping was not warranted or conducted.

16. Marking and Banding

The preseason duck banding program conducted since 1992 was unable to continue during 1995 because of the lack of help. Our inability to hire a temporary biological assistant greatly impacted important research being conducted on the refuge.

17. Disease Control and Prevention

Disease outbreaks are not a regular occurrence on the refuge. Most of the annual mortality is attributed to natural causes among ducklings and goslings. Past diagnostic work has shown that a nematode (*Streptocara* sp.) which causes ulcerative proventriculitus is responsible for a small portion of the young waterfowl mortality on the refuge.

H. PUBLIC USE

1. General

Public use for 1995 was estimated at 22,546; a 71 percent increase over 1994 (Table 16). The increase is likely a result of the return of near average water levels which attracted more people, especially fisherman. The number of visitors utilizing the refuge for wildlife observation and other non-fishing related activities continues to increase steadily. The number of waterfowl hunters using the refuge in 1995 was lower than in 1994. The abundance of waterfowl on Franklin Lake attracted many hunters, which resulted in fewer hunters using the refuge.

Table 16. Estimates of visitors by activity category on Ruby Lake NWR.

Year	Fishing	Wildlife Observation	Migratory Bird Hunting[a]	Other[b]	Total
1995	15521	4562	94	2369	22546
1994	9365	3273	264	300	13202
1993	7196	2871	239	121	10427
1992	7242	2725	52	163	10182
1991	9084	720	324	846[c]	10974
1990	20505	1699	307	1336	23847
Mean[d]	10678	2258	237	553	13726

[a] Estimates for migratory bird hunting are on a calendar year basis; therefore, portions of two seasons are reported.
[b] Other includes trapping, interpretation, x-country skiing, ice skating and bicycling.
[c] Includes gravel hauling for county road project 07/91 to 08/91.
[d] Five year mean calculated for 1990-1994.

2. Outdoor Classrooms - Students

Each year the refuge assists the Elko County School District in providing environmental education to 5th graders. The environmental education program is conducted in an outdoor classroom setting during the spring and fall. Several state and federal agencies, Great Basin College, Mining Companies, and the private sector provide presenters for the program.

Refuge staff conducted six outdoor environmental education presentations during 1995. Wildlife Biologist Mackay presented a program on waterfowl identification to six 5th grade classes on May 19 in Lamoille Canyon. Volunteer Jeanne Tinsman presented a program on

raptors to seven 5th grade classes in Lamoille Canyon on September 20 and to six 5th grade classes at Angel Creek Campground on September 22. Refuge Operations Specialist DesRoberts presented a program on wildlife to six 5th grade classes at Angel Creek Campground.

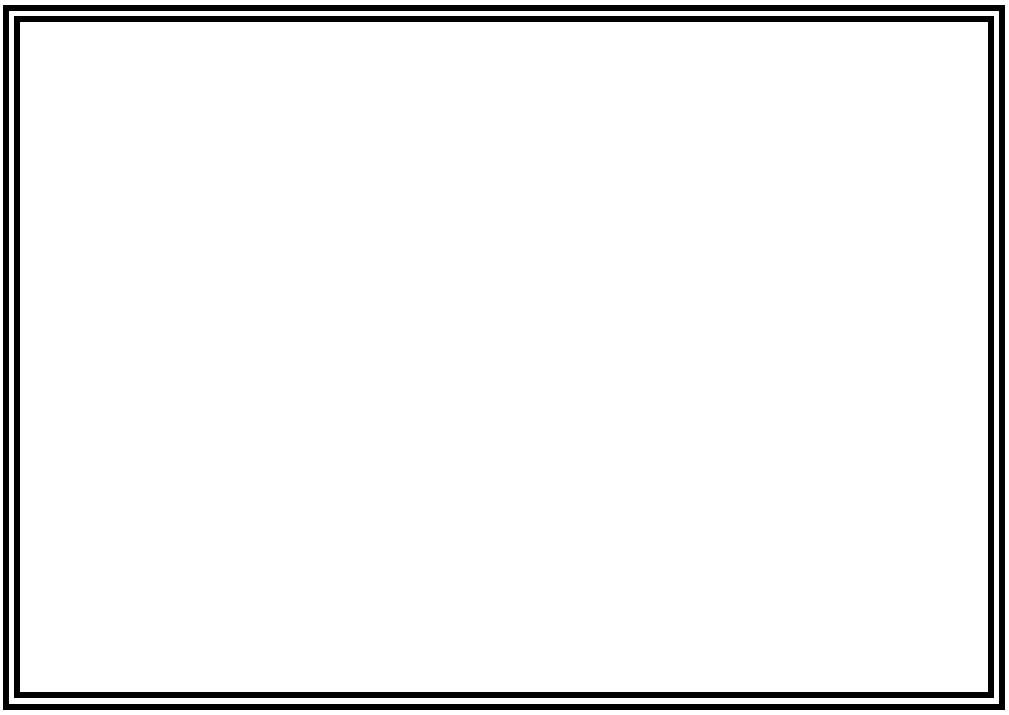

Figure . Volunteer Jeanne Tinsman giving presentation on raptors to 5th graders at Angel Creek Campground. KD 09/95

7. Other Interpretive Programs

Wildlife Biologist Mackay presented a program titled " Wetlands and Wildlife" to six 5th grade classes at Spring Creek Elementry school in Elko on May 2 and 3. Slides of marsh habitat and wildlife were substituted for a tour of the refuge. This program was conducted during the school's Environmental week which is designed to increase awareness of the environment.

In celebration in National Wildlife Refuge Week, refuge staff held a wildlife observation tour and luncheon on 14 October for fifteen people. A substantial outreach effort was made by refuge staff to advertise NWR Week. News releases were sent to seven area newspapers. Articles appeared in the Elko Daily Free Press (front page) and the Elko Independent. Public service announcements concerning NWR Week and the refuge tour were provided by the two local radio stations (KELK & KRJC). Announcements were posted at State and Federal agency offices in Elko, the Elko Chamber of Commerce and Gallagher Fish Hatchery. Assistant Associate Manager Linda Watters was visiting during the weekend of the tour and assisted with providing information about the refuge system.

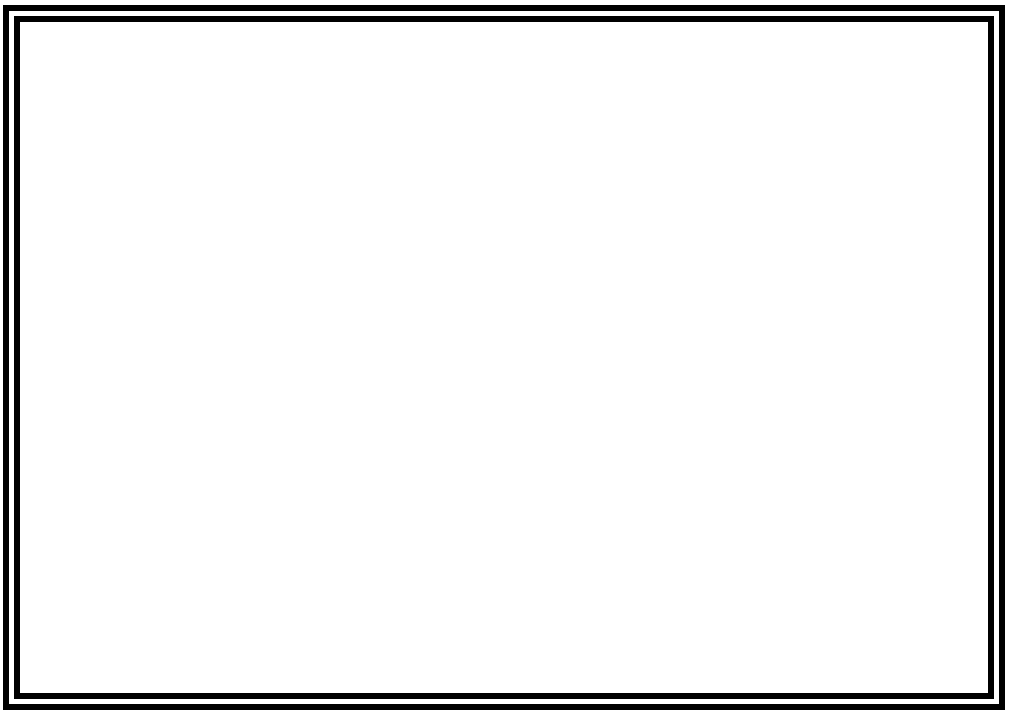

Figure . Visitors received a staff guided tour of the refuge in celebration of NWR Week.
JT 10/95

8. <u>Hunting</u>

Only migratory bird hunting is permitted on the refuge, with open seasons for ducks, geese, coots, moorhens and snipe. Only dark geese may be hunted to prevent shooting of trumpeter swans. The size of the hunt area is approximately 8,600 acres and includes permanent marsh, flooded alkali playas, spring ponds, and meadows.

The 1995-96 migratory game bird season for ducks, mergansers, coots, moorhens and snipe was from 14 October through 14 January. Goose season opened 14 October and closed 21 January.

The combined daily limit on ducks was six, including no more than one female mallard; no more than two redheads; no more than one canvasback; and no more than two pintails of either sex. The possession limit for ducks was twice the daily bag limit. The daily and possession limit for coots and common moorhens was 25. The daily limit for snipe was eight and possession limit was 16. Daily limit for geese was three and possession limit was six.

Hunting conditions in Ruby Valley wereexcellent during the 1995/96 season. Waterfowl numbers peaked in early October. Mild weather conditions throughout the fall and early winter resulted in plenty of open water and the marsh did not freeze until the middle of December. The water elevation of the South Marsh was adequate to provide easy boat access to the hunting area.

Waterfowl hunting information was gathered from only two hunters through surveys conducted by refuge personnel and information requested from local resident hunters (refuge and fish hatchery personnel). These hunters accounted for 24 hunter visits (25.5 percent of the estimated total number of hunter visits), killed 73 birds, and reported 8 crippled birds (birds shot but not retrieved).

The number of waterfowlers hunting on the refuge and the amount of time spent hunting during the 1995-96 season was less than during the 1994-95 season (Table 17). An estimated 286 birds were killed at 3.0 birds killed per hunter visit. Fourteen waterfowl species were known to be killed with coots being the most numerous species bagged, though this number is overestimated because one individual surveyed shot a large number of coots (Table 18). Most hunters do not shoot coots. All other species killed each represented less than ten percent of the bag. The crippling rate was 10 percent.

One state-licensed guide receives a Special Use Permit annually to guide waterfowl hunters on the refuge. This guide led five hunters on two different days, who killed a total of 40 waterfowl.

Table 17. Estimates of statistics for waterfowl hunting on Ruby Lake NWR.

Hunting Season	Hunter Visits	Hours Hunted	Birds Retrieved[a]	Average Birds Per Hunter

1995-96	94	157	286	3.0
1994-95	264	475	634	2.4
1993-94	239	488	515	1.9
1992-93	52	182	57	1.1
1991-92	324	907	680	2.1
1990-91	307	890	583	1.9
Mean	237	588	494	1.9

[a] Includes ducks, geese and coots.

Table 18. Shooting data estimates for the 1995-96 waterfowl season on Ruby Lake NWR.

Species	# Birds Checked in Bag	Percent of Total	Estimated # of Birds Killed
Coot	33	45.2	129
Gadwall	8	11.0	31
Lesser Scaup	7	9.6	27
Mallard	5	6.8	19
American Wigeon	4	5.5	16
Northern Pintail	3	4.1	12
Ruddy Duck	3	4.1	12
Common Merganser	2	2.7	8
Barrows Goldeneye	2	2.7	8
Canvasback	2	2.7	8
Green-winged teal	1	1.4	4
Northern shoveler	1	1.4	4
Redhead	1	1.4	4
Bufflehead	1	1.4	4
Total	73		286

9. Fishing

Anglers visit the refuge in pursuit of largemouth bass and rainbow, brook, cutthroat, brown, and tiger (brown x brook) trout. All trout are reared and stocked by the Gallagher Fish Hatchery which is located on the refuge and operated by the Nevada Division of Wildlife (Section G.12). Fishing for trout on the refuge is best in spring and fall when water temperatures are cooler and trout are more active. Bass fishing is best during the breeding season when adults are guarding fry and during summer months when the water is warmer.

Anglers accounted for an estimated 69 percent of the total refuge visits in 1995. The number of anglers fishing on the refuge in 1995 increased over 1994 by 66%, but was still 24% below 1990 numbers. The bass fishery is recovering slowly from drought impacts but remains poor. Until the bass fishery is re-established, angler use on the refuge is expected to remain low.

11. Wildlife Observation

During the past few years, the number of visitors using the refuge for wildlife observation has increased annually (Table 16). Wildlife observers, including photographers, accounted for an estimated 20 percent of the visitors using the refuge in 1995.

Recent publication of visitor guides on Nevada, which include the refuge, are increasing awareness of the refuge and are likely contributing to an overall increase in non-consumptive visitors.

16. Other Non-Wildlife Oriented Recreation

The refuge is used by bicyclists, picnickers, ice skaters, x-country skiers, etc. These recreationalists likely pursue these activities on the refuge because of the wildlife and wildland scenes.

17. Law Enforcement

Two refuge employees are qualified law enforcement officers; Refuge Manager Pennington and Maintenance Worker Johnson. Both employees attended the law enforcement refresher in Tuscon, Arizona, and completed firearms requalification in Fallon, Nevada.

The peak public use period on the refuge is from spring through fall. Due to low levels of public use in 1995 there were fewer patrols. However, fifteen citations were written in 1995 by both refuge officers and state wardens (Table 18).

Table 18. Summary of citations written at Ruby Lake NWR during 1995.

VIOLATION	NUMBER OF CITATIONS

Hunting in a closed area.	4
Hunting waterfowl during closed season.	2
Wanton waste of waterfowl.	2
Overlimt of trout.	2
Fishing without a license.	1
Failure to tag a deer.	1
Carrying a loaded weapon in a vehicle.	2
Vandalism	1
TOTAL	15

I. EQUIPMENT AND FACILITIES

1. New Construction

Installation of a fire protection system purchased in FY94 (MMS Project 91014M) was completed. A centrifugal fire pump, pipeline, five hydrants, hose reels, and related appurtenances were installed at a cost of $71,000. The new system replaced the one hydrant that was the only means of fire protection for the entire refuge compound.

Two concrete "sweet smelling" vault toilets were purchased and installed (MMS Project 93001M); one at Brown Dike and one at Narcisse Boat Landing. These new handicap accessible restrooms replaced old wooden restrooms that were in need of extensive repair and were not handicap accessible. The total cost including delivery and installation was $19,600.

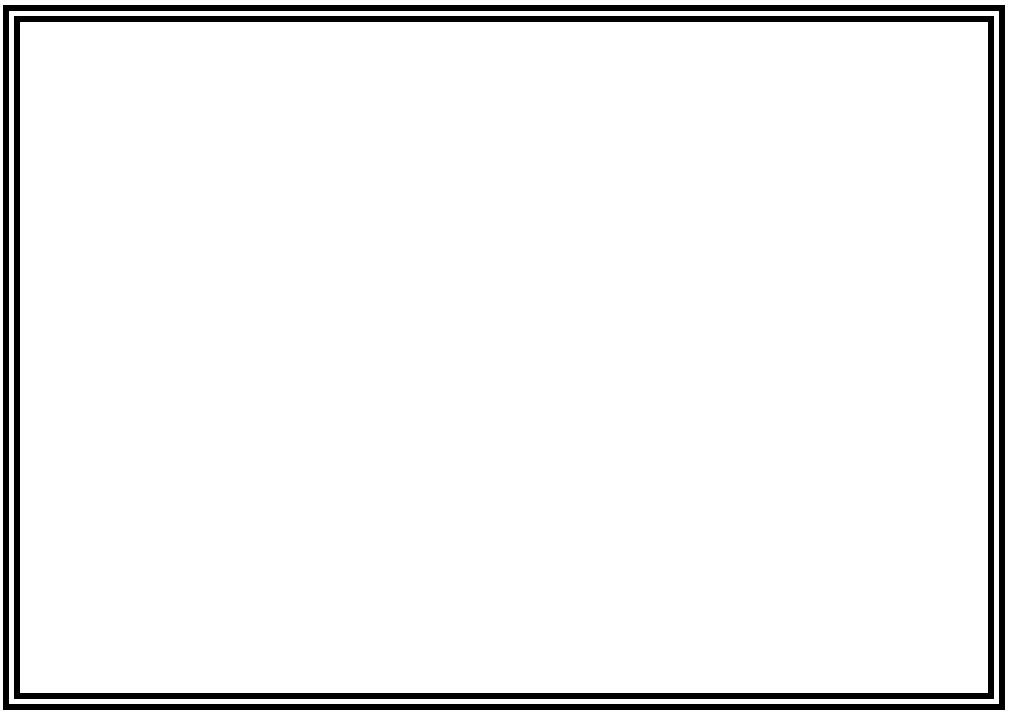

Figure . New vault toilets are more user-friendly and handicap accessible. KD 08/95

Levee construction was initiated in the East Marsh (MMS Project 95005M and DU Site Specific Agreement No. NV-0002-001) on 16 August by Art Lacey Construction of Cambridge, Idaho. Of the $60,000 available for this project, $48,669.19 was spent in 1995. Work had to be stopped on 4 September due to wet conditions. The remaining amount ($11,330.81) will be spent when levee construction resumes in 1996. In addition to this amount, it will take another $28,000 to complete the levee. State required compaction standards have required the use of additional equipment and more time to compact material during levee construction.

The levee construction is part of the East Marsh restoration project. Additional work will include prescribed burning and using heavy equipment to create openings and islands in bulrush. The end result will provide a mosaic of open water areas and vegetation throughout the south unit of the East Marsh which will support a greater number and diversity of wildlife.

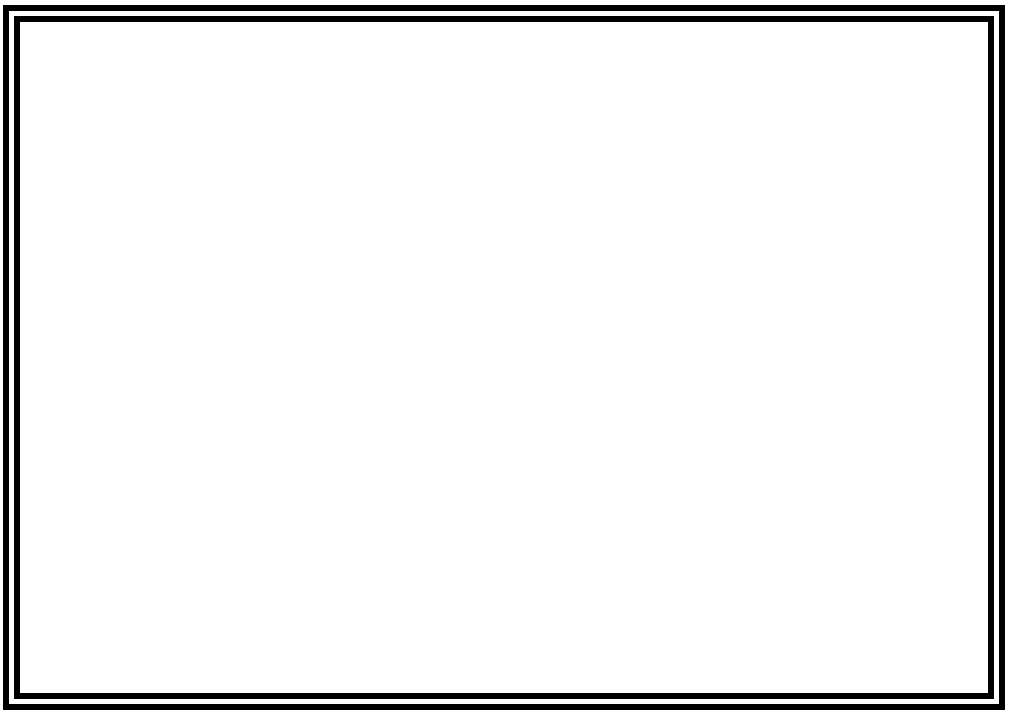

Figure . Levee construction in the East Marsh. KD 09/95

2. <u>Rehabilitation</u>

The refuge received $10,500 for MMS project 91010M for rehabilitation of irrigation ditches

and repairing the North Narcisse Spring levee. The Narcisse Spring levee was repaired and irrigation ditches were recontoured in Units I-C, I-E, I-F, I-GH, and V-D. Slide-gate turn-out structures were installed in Units I-C, I-F, and V-D.

Vinyl siding was installed on the office and Quarters #46 by North American Builders of Salt Lake City, Utah at a cost of $17,100 (Figure). The vinyl siding will save on the annual costs associated with maintenance of wood siding and the insulation board that was installed under the vinyl siding will increase energy efficiency. Eventually all refuge buildings with wood siding will be sided with vinyl.

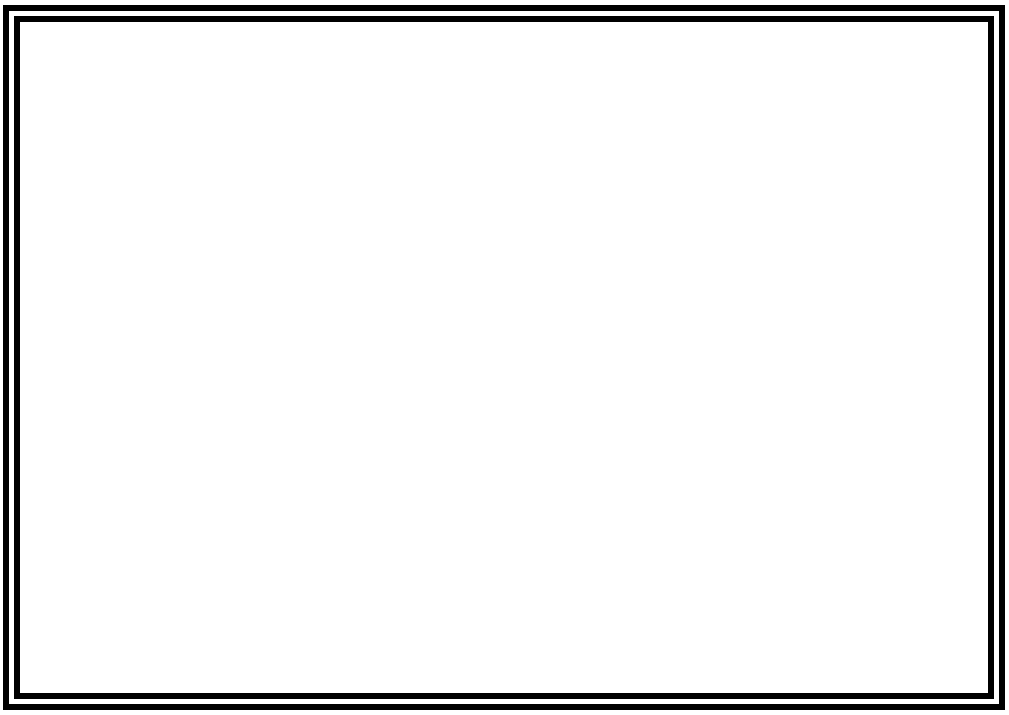

Figure . Vinyl siding is not only maintenance-free but attractive. KD ?date

3. Major Maintenance

The parking lot in front of headquarters was expanded and a concrete slab was poured for the new refuge sign. The expansion will provide adequate parking space for anticipated increases in visitation as bass populations recover and angler visits return to former levels. This project is scheduled to be completed in 1996.

4. Equipment Utilization and Replacement

The old nearly inoperable Mita DC-152Z copier was replaced with a Cannon NP2120 (MMS Project No. 94013M) at a cost of $3342.60.

Seven air actuated traffic counters were replaced with Traffic Tally 3 seismic counters (MMS Project No. 94013M) at a cost of $2,672.

The Bard air conditioning unit in the YCC bunkhouse and the oil furnace in Quarters #46 were replaced. The total cost was $6,450.

A 1995 Ford Ranger was received as replacement of the 1978 Chevy Luv (FY94 MMS Project No. 94003M).

The 1988 Chevy S-10 Blazer was replaced with a Jeep Cherokee (MMS Project No. 94007M).

A Cannon Color printer was purchased for the manager's computer.

6. Computer Systems

Two of the refuge computers were upgraded to meet the memory and space requirements of new and upgraded software.

J. OTHER ITEMS

1. Cooperative Programs

Wildlife Biologist Mackay conducted spring and fall shorebird surveys on the refuge and in northeast Nevada. This is a cooperative effort with the Nevada Division of Wildlife and the Point Reyes Bird Observatory.

Six refuge employees (one permanent and five YCC) and one volunteer backpacked into the Goshute Mountains in late July. The purpose of the trip was to assist with setting up the main camp at the Goshute Mountain Raptor Project site in northeast Nevada. The Project is staffed by volunteers who gather data on raptor migration by observation and trapping. The work is organized by Hawkwatch International, a non-profit organization which receives funds from the USFWS and the Bureau of Land Management.

Refuge staff participated in a fishing derby at Angel Lake on 15 July in cooperation with the U.S. Forest Service and Nevada Division of Wildlife. The derby, which was in celebration of National Fishing Week, drew 110 participants; 80 children and 30 adults.

Refuge staff operate a weather station in cooperation with the National Weather Service. Weather information has been collected daily since 1940.

4. Credits

The completion of the 1995 Annual Narrative Report was accomplished by several people. Kim Hanson prepared sections E1 and 5, and H17 and edited the report; Jeff Mackay prepared sections B, D5, F, G, and J, and edited the report; and Kevin DesRoberts prepared sections D3, 4, and 6, E2, 4, and 6, H except for H17 and I and edited the report. Monica (Niki) McQueary assembled the report.

Photo credits:

JM: Jeff Mackay
KD: Kevin J. DesRoberts
JD: Justin Dean
JT: Jeanne Tinsman